VOL. LXXX PART SEVEN

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

JULY 1955

	PAGE
The Secretary's Page	293
Study of Coniferous Trees	295
Invited Trials, 1956–1957	295
Notes from Wisley. By J. B. PATON	296
Our Experience in the Cultivation of Cacti and Succulent Plants. By. Lt.-Gen. Sir OLIVER LEESE, Bt., K.C.B., C.B.E., D.S.O., and Lady LEESE. *Illustrated*	300
The Production of Hardy Out-of-Season Flowers for Cutting. By H. W. ABBISS, M.B.E., D.C.M., M.M., N.D.H., F.L.S.	309
E. A. Bowles (1865–1954), The Man and His Garden. Part I. By W. T. STEARN	317
NOTES FROM FELLOWS	
Agave parryi. By Sir RALPH NEWMAN, Bt. *Illustrated*	327
Sweet Box (*Sarcococca confusa*). By L. PALMER, V.M.H.	328
Bees and *Tilia petiolaris*. By GEORGE W. STACEY	328
A Hardy Maidenhair Fern. By CHARLES H. CURTIS	329
Plants and Problems—XVII	330
WISLEY TRIALS, 1954:	
Sweet William	333
Autumn-sown Onion	334
Rhubarb	334
Shallot	335
Plants to which Awards have been made in 1954 and 1955	336
Book Notes	337

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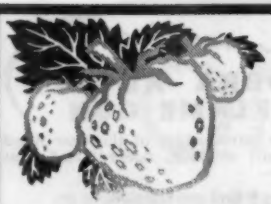

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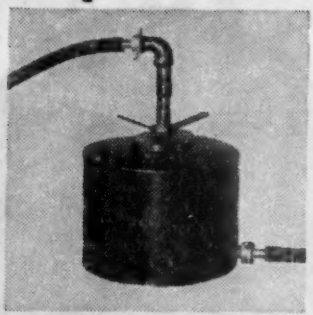

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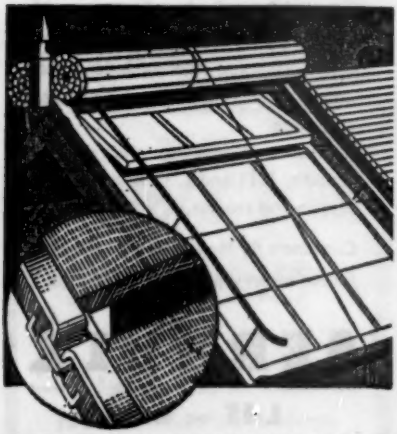

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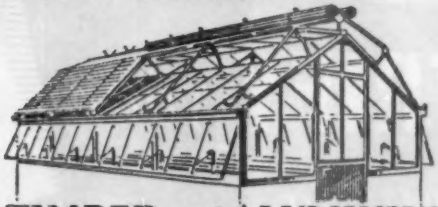

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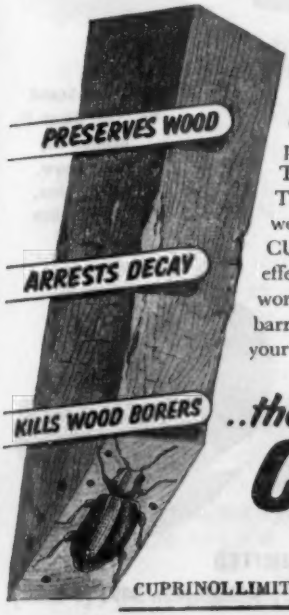

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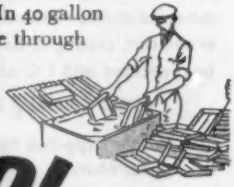

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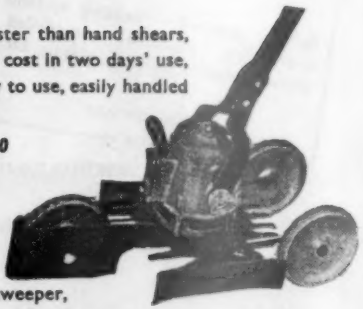

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

VOL. LXXX PART SEVEN

July 1955

THE SECRETARY'S PAGE

ANNOUNCEMENTS—JULY AND AUGUST

Shows

FRIDAY, JULY 1 11 A.M. to 7 P.M. SATURDAY, July 2 10 A.M. to 5 P.M.	National Rose Society's Show.
THURSDAY, July 7 12 NOON to 6 P.M.	Floral Arrangement Competition for Amateurs.
TUESDAY, July 12 12.30 P.M. to 6 P.M.	Fortnightly Flower Show.
WEDNESDAY, July 13 10 A.M. to 5 P.M.	Fruit and Vegetable Competition.
TUESDAY, July 12 12 NOON to 7 P.M. WEDNESDAY, July 13 10 A.M. to 5 P.M.	British National Carnation Society's Show.
TUESDAY, July 26 12 NOON to 6 P.M. WEDNESDAY, July 27 10 A.M. to 5 P.M.	Fortnightly Flower Show.
TUESDAY, August 9 12 NOON to 6 P.M.	Fortnightly Flower Show. Gladiolus Competition.
WEDNESDAY August 10 10 A.M. to 5 P.M.	British Fuchsia Society's Competition.
FRIDAY, August 12 12 NOON to 6 P.M. SATURDAY, August 13 10 A.M. to 5 P.M.	British Gladiolus Society's Show.

Shows—(*continued*)

TUESDAY, August 23
12 NOON to 6 P.M.
WEDNESDAY, August 24
10 A.M. to 5 P.M.
} Fortnightly Flower Show.

Lectures

TUESDAY, July 12, at 3 P.M. "Modern Carnations and Pinks," by MR. M. C. ALLWOOD, F.L.S., V.M.H.

TUESDAY, July 26, at 3 P.M. "The Influence of Horticulture in Public Parks," by MR. T. E. CLARK, F.INST.P.A.

TUESDAY, August 9, at 3 P.M. "Insect Life in the Soil," by PROF. H. W. MILES, M.SC., D.SC.

Demonstrations at Wisley—The following demonstrations will be given at Wisley, those on the second and third days being repetitions of that given on the first.

Flower Garden

July 20–21–22. The Vegetative Propagation of Shrubs and Herbaceous Plants. (Commencing at 2 P.M.)

Film of Australian Wild Flowers—In the Lecture Room at 3 P.M. on Wednesday, August 10, MR. B. L. CHAMBERS, a Fellow from New Zealand, will show a film of the flora of Western Australia, taken during a journey by car in 1953. Fellows of the Society are cordially invited to attend.

The National Sweet Pea Society's Show—The arrangements for this Show were altered after the R.H.S. *Diary* had gone to press. The Show was held at Dover on June 29 and 30, and, therefore, the National Sweet Pea Society will not hold a Show in the R.H.S. Hall on July 5 as indicated in the *Diary*.

Commonwealth Exhibition at Marlborough House—For the first time for nearly a quarter of a century, the grounds of Marlborough House, St. James's, will be open to the public on Tuesday, July 19 and Wednesday, July 20, from 10.30 A.M. to 8 P.M.

The occasion will be a Commonwealth Exhibition and Market to raise funds for the Distressed Gentlefolks' Aid Association.

The focal point of the Exhibition will be a floral map, 30 feet by 15 feet, showing the tours made by H.M. THE QUEEN. This lovely arrangement of flowers will be staged by MRS. CECIL POPE and members of the Floral Groups throughout the country.

There will also be displays of Commonwealth foliage and flowers.

Through the kindness of the High Commissioners, seven marquees will contain exhibits from Commonwealth countries, and there will be a market of stalls for the sale of gifts.

STUDY OF CONIFEROUS TREES

Information sought about less common species

The Research Branch of the Forestry Commission has started work on a general review and study of the numerous coniferous species which are growing in this country, in the course of which it proposes to summarize all the existing information and to assess the importance of each of the various species from the point of view both of arboriculture and of silviculture. This work, which will take some time to complete, will be recorded in a series of reports to be issued at intervals.

A considerable body of information has already been assembled, but planting, for ornamental purposes and for forestry, has been so widespread that it is not easy to make sure that all the important evidence has been collected. This is particularly true of the trees which are not normally regarded as of immediate forest importance.

An appeal is therefore made to owners of coniferous trees and plantations and to all others interested for information about specimen trees and plantations of the less common species of conifers growing in this country. Details giving the species, the size and, if possible, the age of individual trees and the approximate age, height and extent of plantations, together with the localities, will be most gratefully received and acknowledged. These should be sent to MR. J. R. ALDHOUS, Forest Research Station, Alice Holt Lodge, Wrecclesham, Farnham, Surrey, or to MR. M. V. EDWARDS, Forestry Commission Research Branch, Government Building, Bankhead Avenue, Edinburgh, 11.

INVITED TRIALS, 1956–1957

The Royal Horticultural Society will carry out during the season 1956–1957 the following invited trials for which entries are invited.

Flowers

Herbaceous phlox, varieties of *Phlox paniculata;* three plants of each variety.

Vegetables

Lettuce, varieties suitable for cultivation under Dutch lights; ½ oz. of seed of each variety.

Conditions for entry to the Trials

1. All entries must be made on the appropriate form obtainable from The Director, The Royal Horticultural Society's Gardens, Wisley, Ripley, Woking, Surrey.

2. The entrant must certify on the form either
   (*a*) that the variety or strain has been raised or developed by him.
   or (*b*) that the variety or strain was, or is about to be, introduced by him to British commerce.

The entrant must also supply sufficient particulars of the history of the variety or strain to substantiate his certificate, but such particulars will not be published by the Society without the sender's consent.

3. Entry forms to be received at Wisley on or before August 31, 1955.

4. In the event of too many entries being submitted for a particular trial the Council of The Royal Horticultural Society reserves the right to scale down the number of entries received.

NOTES FROM WISLEY

J. B. Paton

DURING the winter new herbaceous borders have been planted on either side of the broad grass walk which leads to Battleston Hill. Thus it may be appropriate to note a few of the plants to be seen in these borders as well as some others in the older herbaceous borders situated in front of the Restaurant. Fellows may remember that we discussed some herbaceous plants in these notes in June 1953.

The Compositae is the largest family of flowering plants and it provides a great wealth of decorative perennial plants suitable for cultivation in a herbaceous border. The main botanical features of this family are that the leaves are usually alternate and without stipules, the florets are usually aggregated together into close heads surrounded by an involucre of bracts and the individual florets may be either neuter, unisexual or hermaphrodite.

A new race of *Erigeron* is represented by the varieties 'Festivity,' 'Vanity' and 'Felicity.' These plants are all vigorous and strong growing; 'Festivity' carries on a 2-foot-high stem fine rayed lilac flowers which may be up to 2½ inches across, 'Vanity' is a clear pink and being 2½ feet tall is suitable for cutting for decoration, while 'Felicity' is a fairly dwarf deep pink best placed in the front of the border. In the Trial Grounds there is a trial of erigerons which is due to be judged this summer. All these erigerons, which flower so freely from mid June to late August, are very valuable acquisitions to the hardy flower border.

While the wealth of horticultural varieties are the mainstay of the border it is pleasant to be able to note a few species which still can hold their own with the best of the cultivated varieties. *Artemisia nutans* and *A. palmeri* both have silvery-grey foliage. *A. nutans*, from the Canary Islands, has pale yellow hemispherical flowers carried on pyramidal

leafy panicles, and *A. palmeri*, from California, has yellow flowers densely set in spikes which make an elongated panicle.

With an extensive distribution from America to Asia, *Anaphalis margaritacea* has the common name of "Pearly Immortelle" on account of its white fluffy balls of flower and chaffy membraneous calyces. It may be cut in August, dried and used for winter decoration and its white flowers are often dyed bright red or blue. Also from America is *Vernonia crinita*, sometimes called *V. arkansana*; in July and August it carries large flower-heads containing up to seventy purple flowers.

An easily grown plant, especially on light soils, is the American *Liatris callilepis* with bright carmine flowers forming a long spike. Another American from eastern and southern United States, is the dwarfer *L. spicata*, with a bluish-mauve inflorescence, an unusual feature of which is that the flowers open from the top of the inflorescence downwards rather than in the reverse direction. Also dwarf is *Buphthalmum salicifolium*, a native of Austria with yellow flowers from June to October. Likewise with a long flowering season is *Rudbeckia laciniata* whose yellow pendent rays surround a central greenish disc. This is a robust growing plant suited to the back of the border. Closely related is the genus *Echinacea*, of which may be seen *purpurea* and its variety 'Abendsonne.' The species has flowers in shades of rose while the latter has glowing rose-red rays.

The collection of heleniums is quite comprehensive and includes some of the newer cultivars raised on the Continent. Of the older ones *Helenium* 'Riverton Beauty' is a tall yellow late-flowering plant, while of medium height, around 3½–4 feet, we have 'Golden Youth' a soft yellow and most deservedly a popular plant, 'Madame Canivet' with rich golden-yellow ray florets around a dark disc, and the bronzy-yellow 'Wyndley.' Of dwarfer stature is the very bright yellow, dark centred 'The Bishop.' We may note, of the newer varieties, 'Goldlackzwerg,' whose deep golden brown-red flowers last exceptionally well, and the copper-orange 'Kupfersprudel.' The former grows 2½ feet in height while the latter is 3⅓ feet tall. Other members of the Compositae which are of interest include *Achillea* 'Fire King,' a deep crimson form of *A. millefolium* and the Irish-raised *Anthemis* 'Grallagh Gold,' which is a bright yellow variety of *A. tinctoria*.

The outstanding member of the family Polemoniaceae is the genus *Phlox*, but its representatives in the borders do not give a complete idea of the splendid varieties now available. However, a trial of these plants is scheduled to be started this autumn and we hope soon to see some interesting novelties. Of the older varieties to be seen this year one of the first to catch the eye is the brilliant orange-red 'Brigadier' with a very large individual flower or pip. Of the reds, 'Charles H. Curtis' is a really brilliant colour and 'Gleneagles Glory' is a shade of orange-scarlet. In the pink hues, the salmon, red-eyed 'Daily Sketch,' the pale pink, crimson-eyed 'Bright Eyes,' and the salmon pink, white-eyed 'Duchess of York' are all extremely attractive. Of the mauve and purple

shades the light mauvy-blue 'Eventide' is late flowering, the lilac pink 'Lilac Lady' a strong grower and the deep lavender 'Amethyst' a taller plant than most varieties, being up to 4 feet high. Fellows are often troubled by the phlox eelworm which causes distortion of the leaves and eventual stunting and death of the plants. It can be overcome by propagating only from the roots. Small pieces of root should be taken from the plant in the autumn, cut into lengths of 1 inch and stored in moist peat in a frost-proof shed for the winter. By early spring the cut ends will have callused and the cuttings may be spread out in a cold frame and covered with a 1-inch-thick layer of soil. By autumn the plants will be large enough to set out in the open ground.

Many other families are represented in the borders, but only in small numbers. In Campanulaceae there are *Campanula* 'Wedgwood' and *C.* 'Loddon Anna' bothof which recently have received Awards of Merit. *C.* 'Wedgwood' is a variety of *C. persicifolia* and is easily raised from seed, producing flowering-size plants in the year after sowing. It has deep blue nodding bells fifty of which may be carried on one stem with twelve open at one time. *C.* 'Loddon Anna' is a beautiful pink form of *C. lactiflora*. Both these bloom from late June to August as does the older 'Fleur de Niege' with double white blossoms carried on a stem 2½ feet high. Also in this family is *Platycodon grandiflorum* a dwarf-growing plant which resents dusturbance and which has dainty pouch-like flowers in either blue or white.

Of the family Scrophulariaceae the new race of veronicas, raised in this country, has attracted much attention since some varieties received awards after trial at Wisley. *Veronica* 'Pavane' is tallest, being 2 feet high, with erect spikes carrying pink flowers over a fairly long season. *V.* 'Minute' has a neat habit, grey-green foliage and pure pink flowers, and *V.* 'Barcarolle' a very compact habit and deep pink flowers carried on an erect spike. This last variety also would be suitable for growing on a rock garden.

Also in this family is the genus *Penstemon* of which there are *P.* 'Schoenholzeri,' which is a hardy border plant with large red flowers to be seen from June to September, and *P.* 'Garnet' with deeper red flowers produced over the same season.Two of the best species for the border are *P. isophyllus*, which although coming from Mexico is reported to be hardy on well-drained soils and has 2½-inch-long deep crimson blooms, and *P. ovatus* with flowers of a fine blue from central United States. Although all these plants normally survive the winter outside, the prudent gardener takes cuttings in the autumn in order to carry over a stock in frames during the winter.

Of the sedums, members of the Crassula family, two of the best known are the reddish-purple flowered *Sedum telephium* and *S. spectabile*, a favourite on account of its glaucous leaves carried on unbranched stems and its pink flowers in wide flat-topped corymbs. There is now available an improvement on the latter with glowing carmine-red flowers, known as *S.* 'Meteor.'

PLANTS OF INTEREST AT WISLEY DURING JULY

LABORATORY WALLS AND PONDS

Abutilon megapotamicum
Ceratostigma willmottianum
Fremontia californica
Nymphaea 'Escarboucle'
,, 'Sunrise'

GLASSHOUSES

Cassia corymbosa
Cuphea micropetala
Eupatorium micranthum
Fuchsias in variety
Lonicera hildebrandiana
Mandevilla suaveolens
Pelargoniums in variety
Solanum wendlandii
Sphaeralcea fendleri

WILD GARDEN

Eucryphia glutinosa
,, × *nymansensis*
Lilies in variety
Magnolia virginiana
Primula florindae
Rhododendron auriculatum
Tropaeolum speciosum

SEVEN ACRES

Aesculus parviflora
Buddleia davidii varieties
Butomus umbellatus
Catalpa bignonioides
Genista cinerea
Heather Garden
Pontederia cordata
Spiraea × *bumalda*

ROCK GARDEN AND ALPINE HOUSE

Acantholimon venustum
Codonopsis clematidea

ROCK GARDEN AND ALPINE HOUSE—*continued*

Codonopsis ovata
Convolvulus mauritanicus
Cyananthus lobatus
Gentians in variety
Gunnera manicata
Houttuynia cordata
Iris kaempferi varieties
Malvastrum lateritium
Mertensia sibirica
Osmunda regalis
Sphaeralcea munroana
Theropogon pallidus
Verbascum spinosum

WEATHER HILL

Annual Border
Roses

FLORAL TRIAL GROUNDS

Trials of Border Carnations
,, ,, Delphiniums
,, ,, Erigerons
,, ,, Garden Pinks
,, ,, Hemerocallises
,, ,, Stocks
,, ,, Sweet Peas

BATTLESTON HILL

Eucryphia species
Lilies in variety
Rhododendrons in variety

VEGETABLE TRIAL GROUNDS

Trials of Sweet Peas
,, ,, Beetroots
,, ,, Dwarf French Beans
,, ,, Summer Cabbages

OUR EXPERIENCE IN THE CULTIVATION OF CACTI AND SUCCULENT PLANTS

Lt.-Gen. Sir Oliver Leese, Bt., K.C.B., C.B.E., D.S.O., and Lady Leese.

(*Lecture given on February* 8, 1955; SIR GILES LODER, BT., *in the Chair*)

PART I

"GEOGRAPHERS crowd in the edges of their maps parts of the world which they do not know about, adding notes in the margin to the effect that beyond this lies nothing but the sandy deserts full of wild beasts." So wrote PLUTARCH in the first century A.D.

It is in these deserts that the 1,600 species of cactus and the 4,400 species of succulent plants grow, under the most varied and extreme climatic conditions; and to me it is always one of the great wonders of the world, that they should flourish, let alone flower under the very different conditions that we can give them over here.

I am convinced, however, that if we can only master more of the problems of watering, light—both sunlight and artificial—and periods of rest, it is possible for us to give them far greater opportunities, than we do now, to grow and to flower really well.

To start with, I am going to describe the Sonoran Desert of North America, which covers some 120,000 square miles of those parts of the U.S.A. and Mexico which surround the Gulf of California. I have chosen this, as in this desert flourish some 300 of the most interesting and important species of cactus. Like most deserts of the world it is situated in the western portion of the continent, where warm, dry, descending air dissipates the cloud cover and allows more sunlight to reach and heat the ground—while the coastal ranges of California and Mexico shadow the land from the rain-bearing winds of the Pacific. The country consists of bald eroded mountains, desert flats, restless dunes, parched river-beds and waterless lakes. The great feature of the desert is the sun and intense heat, which in Death Valley—only a few hundred miles to the north in California—raised the average mean temperature of 102° in the shade to the record of 134°, only 2° below the Sahara's record of 136°.

This is no ordinary land; nor is anything in it ordinary. This is a land of miracles, of strange and wondrous things; and the greatest miracle of all is the blossom of the flowering cactus.

One of the phenomena of this weird land is the strange shapes of the plants which, whilst bearing little resemblance to other flower-bearing plants in the world today, produce these lovely flowers. Their remote ancestors, after centuries of existence in a region becoming progressively drier, reduced their branches and twigs to spines, and either diminished their leaves to all but invisible scales or discarded

them altogether for spines, with the skin of the plant producing chlorophyll and transferring the function of food manufacture from the leaf to the trunk and stems of the plant. Furthermore, cacti, unlike any other plant, have areoles, which produce spines, and new joints, which root when they fall to the ground or are transplanted. These areoles are in fact the vital growing areas of cacti.

Cacti thrive best on the slopes, "bajadas" as they call them, in any shady place, against a rock—in fact in any place where there are some water-holding properties or dew. With their spreading root systems they are able to absorb and store quantities of water in a single rainstorm in their thick expansible stems. Other xerophytic plants, like the paloverde, conserve water by resorting to minute leaves in order to reduce the amount lost from their surfaces by transpiration, whilst the ocotillo survive prolonged dry spells by shedding their leaves entirely, or by letting whole branches die back in order to keep their roots alive. Then there are the ephemerals, or flowering annuals, which lie dormant in their seeds during the dry periods. Suddenly, after a freshening rain, they germinate, flower and bear seeds all in six to eight weeks.

The animals are just the same. They are mostly small and they can all subsist on a minimum of water—some find it in desert plants, some in the living prey they hunt by night. They could not subsist in the noonday heat—and they live underground, under rocks, under plants by day.

But to all of these—man—animal—plant—there comes at long last the longed-for rain. In general, desert rains originate from two seasonal sources—cyclonic storms borne by the westerlies in winter—and local thunderstorms in summer. Yet they are very capricious, so that in one part no rain will fall for years on end. Frequently evaporation is so rapid that raindrops disappear in the upper air and never reach the ground. In the gentler ephemeral floods of the winter, the water seeps into the ground and disappears; but the summer rains of Arizona are very violent and usually descend in brief but torrential downpours. Moist tongues of air from the Gulf of Mexico form low-pressure centres over the desert, as a consequence of the intense heating of the land. These spiral upward and form a pillar of rain which explodes in nearly solid sheets with frozen hailstorms. Flooding the channels between the bajadas and forming torrents in less than half an hour, they cut their way through rocks and desert flats, and dissect the land into an intricate mass of narrow canyons and knife-edge ridges known as Bad Lands. Eventually, they find their way into some waiting lake or Playa, a kind of sun-cracked dry lake.

We will now leave the deserts of America and look for a moment at those of South Africa. Here are the homes of many succulent plants including the 2,400 members of the Mesembryanthemum family. This is a land of brown scrub, of stony, flat-topped hills, once more characterized by great heat and lack of rain—sometimes in the great Karroo in Cape Province, and more so in South-West Africa, droughts have

been known to last for two and even three years. Sometimes all the rain comes in a few days or weeks and the plants are dormant for 9–10 months of the year. Nights can be very cold and temperatures often drop to 32° F., so that there are heavy dews which evaporate on the leaves of the succulents and drip slowly off the leaves down to the roots. You find succulents growing all over the Union in every kind of soil and climatic condition; but in general the dwarf succulents flourish most either in the 30-mile coastal belt, where they get added moisture from the mist; or in the arid, higher, well-drained regions, often up to 6,000 feet.

Sunlight is probably once more the most potent factor, for although the average length of daylight in the Union is less than that of England in summer, the average sunlight is double that of England—Cape Town, for instance, having an average of 245 days and Kimberley 285, against 120 days in London.

Like North America, the annuals and bulbs of the South-African deserts provide a carpet of glorious colours after the rains, and if you look down from the hills, you see a golden streak of gazanias along the valleys.

The periods of rainfall in South Africa vary considerably, some being in the winter and others in the summer, and this has a very important bearing on the treatment, and especially the watering, of species of genera such as the *Lithops* and *Conophytum*, in this country. Many species grow where frosts occur, but these areas are usually dry and the plants are dormant. There are occasional light falls of snow in the Karroo, but both this and the frost usually disappear rapidly after sunrise.

We find other succulent plants in the coastal areas of Eritrea, Abyssinia and Morocco, including the candelabrum trees, *Euphorbia abyssinica*, *E. candelabrum* and its var. *erythraea*. In Madagascar you find the "Christ's Thorn," *E. splendens*, which is used freely in Southern Rhodesia as hedges for the cattle. Many beautiful succulents come from the Canary Islands, such as *Aeonium tabulaeforme*, which grows flat on the cliff sides. On the coasts of the Mediterranean you find a number of cacti and succulents. There are beautiful cactus gardens on the Italian and French Rivieras, where the climate is mild and warm in summer, often with two or three months of drought, and in winter there is little and probably no frost. It is said that most of these plants were introduced to the Mediterranean region before 1600 by Columbus's sailors. Now they flourish freely and you find agaves used to stop erosion on the coastal slopes, and opuntias as hedges, to contain the savage bulls for the bull-fights in Spain.

We will now turn to the tropical jungles of Central and South America. Here, as epiphytes, high up on the branches of the jungle trees along with rare orchids, we find the genus *Epiphyllum*, with their glorious trumpet flowers of many a lovely hue. These plants are not parasites and they do not derive their nourishment from the bark of

the trees. They are air plants, using the trees solely as a resting place, with their roots in the deposits of the highly nitrogenous humus lodged in the fissures of the bark, while the air roots along the branches feed the joints farthest away from the root system. The branches of these plants —often 10 ft. long—hang pendent from the trees. Twilight prevails in these immense forests, but a certain amount of sunlight reaches these shade-loving plants through the moving foliage.

In the rainy season water falls incessantly from leaf to leaf. The extreme warmth expedites the evaporation from the soil, and the humidity is often as high as 90 per cent. One would think that a cactus plant would rot under these circumstances, but the water runs naturally off the waxy branches so that the humus in which the roots live remains friable, and in this way, though they enjoy a temporary drenching, they never become sodden.

I must just refer to the deserts of Argentina and Bolivia, otherwise you will imagine that South America is one vast tropical jungle. In these deserts we find some very interesting cacti, notably *Echinopsis*, *Lobivia*, *Rebutia*, and *Gymnocalycium*, all of which, incidentally, can be made to flower splendidly in this country.

I have tried to tell you something of the very varied and extreme conditions in which cacti and succulent plants grow in their own habitat, and it is to me one of the great wonders of nature that they should flourish, let alone flower, in this country.

Now let us see what happens to them when they arrive in our dark and inhospitable climate.

Part II

From the wide open space of the world and travelling by way of parent plants and seedlings to the Continent, the cactus arrives in the market in England a rather pitiful object, but even more pitiful by the time the shop assistant has said "Oh, only a cactus—it needs no water," and the customer has left it several weeks on the grand piano far from the light. This may be an unkind exaggeration, yet it is true that many cacti and succulents do look dreary and hideous, remaining so for year in, year out, in the same small pot, even though tended faithfully by proud owners.

No wonder I overheard one lady, looking at our stand at a Chelsea Show, say: "My dear, do look how clever they are—because you know cacti only bloom every hundred years."

Luckily we have in this country many clever nurserymen and very many amateurs who grow them beautifully, and whose greatest ambition is to make each species bloom as often as the climate of England allows. The flowering of the plant is to all the important object.

It is no use, however, expecting a plant to flower before it has grown to maturity. So the small *Cereus* has to grow into a tall tree before it flowers. *Pachycereus pringlei*, some 50 feet high, is, I believe, the largest

cactus in the world—larger, I am told, than *Carnegiea gigantea*, or "Sahuaro," whose well-known form appears in most Arizona desert pictures (Fig. 62).

There are many other forms of smaller *Cereus*: *Cephalocereus senilis*, with its long white hair, is one of the best known, and another white *Cereus* coming from South America is *Cleistocactus strausii*.

After the genus *Cereus* in height comes the old prickly pear, or *Opuntia* to give it its correct name. It is a huge genus and in its common form spreads only too well in lands suitable for it, such as Australia. In its more uncommon forms it can be rather attractive and it is greatly beloved by small boys—for the pricklier the cactus, the younger the admirer.

There are other forms of *Opuntia* which have joints instead of the pads. In America they are known as chollas and there is a special one, *O. Bigelovii*, which has white bristles and is known as the "Jumping Cholla," as its joints break off the tree spontaneously and hurtle at anyone, riding or walking. Its bristles, with fine barbed spines, catch on to the rider and horse alike, and are very difficult to remove. This dropping of the joints is its method of propagation (Fig. 63). Another jointed and strange species is *O. glomerata* (*O. diademata*), or "Paper Opuntia," so named for its spines, which look as if they were made of paper.

Perhaps the next of interest is the barrel cactus—one of the true desert cacti and one well prepared for that way of life. Its tough, strongly ribbed stem is heavily waxed to prevent the escape of moisture. In addition, it is covered by stout and highly coloured spines, which further decrease evaporation by cutting off 20 per cent. of the sunlight. *Ferocacti* are the most flamboyant of these barrel cacti, with their lovely coloured spines and flowers around their tops, like garlands or gay hats. Another favourite is *Echinocactus grusonii*, known to the Italians as "Mother-in-law's Chair." These very rarely flower in England as they require a great intensity of light towards the end of the summer.

Another popular plant is *Notocactus leninghausii* which has lovely yellow blooms, although it does not flower till it is a certain height. *Notocactus* is a most attractive genus for collectors as the species flower easily at an early age, and every year.

So, too, do most of the large genus *Mammillaria*. There are over 300 different species. Many have beautiful spine formations and their flowers, though small, are like a crown, and come every year, while some have brightly coloured fruit. There are also the *Rebutias*—tiny plants freely producing flowers of yellow, red, scarlet and magenta in the spring.

One of the oldest genera of desert cacti is *Ariocarpus* and it is one of the most difficult in cultivation as the seedlings grow so slowly. Most of the plants seen in this country are imported. These, dug out of rocks, with all their roots cut off, are exceedingly hard to re-root, and anyone buying them must take a chance. We only water these plants twice a year—at the beginning of July and a fortnight later.

Another and easier plant is *Astrophytum*; there are several species and most of them can flower in this country.

We cannot mention all the plants worthy of the collector—*Gymnocalyciums*, *Parodias*, *Lobivias*, *Coryphanthas*, and not forgetting the one-time common *Echinopsis*, or "Easter Lily," which for twenty-four hours sends out a large pink or white sweet-scented flower.

As we have already said, the flowering of these plants is the aim of all collectors. The first essential is light; just to exist they need this, and no plant does well if grown behind a lace curtain or on the sideboard away from the window. Although some species flower in the house, a greenhouse gives them a better opportunity, but the greenhouse must be frost-proof, and a temperature somewhere about 45°–50° F. is a good average for winter. Even if this falls lower in bad weather the plants will be none the worse as long as they are dry. They cannot stand a damp cold and it is fatal to water them if the temperature is very low. On the other hand, if kept in a living-room in the winter where central heating and constant fires keep them from becoming dormant, water must be given occasionally. I believe that plenty of sun in September is a very important factor for the ripening of the cactus plant and in consequence for its future flowering. After then it requires rest in dry, cool conditions. It might be most interesting to do some experiments with artificial light at that time of the year. Some balance of water, light and rest must be the solution of the flowering problem.

Our own routine is as follows: When the days get longer and warmer the plants begin to grow and we start watering. This is probably about April. We dip the pots of our show plants, leaving them in a tray till the water seeps through—and for not a moment longer. This insures that the ball of earth around the roots gets really wet. This method is not recommended by all the experts, but we have found it pays, and as a rule we do the second watering two to three weeks later in the same way. Then as the weather gets hotter and the plants start growing well, we water overhead twice or three times a week, remembering always the importance of letting the pot dry out before re-watering. Spraying is good for intermediate times as long as it is done like the watering—in the early morning or in the late afternoon, so that the plants are not scorched. It is important not to let the water stand in the centre of a plant like a *Rebutia*, or the moisture acts like a magnifying glass and the growing centre is ruined. In the autumn as the light fades we begin to give less water—once a week and then once a fortnight, and finally when the weather gets cold at the beginning of November we stop watering. There are, of course, exceptions, for if there is a break in the weather such as we have just had, we do water the cactus plants a little, especially the plants that come from less arid climes.

I would like to talk to you at great length about the *Epiphyllums* and *Zygocacti*, as they are among the best house plants one can have. Beautiful hybrids are being grown in America and, as the dollar situation eases, I hope we shall see many of them in this country. As you already

know they are forest plants and therefore want completely different cultivation. The one we know best in this country is the *Zygocactus truncatus*, or the "Christmas Cactus," one of the easiest plants to flower, and one which we often see growing in cottage windows.

We must now turn to the African succulents. They, too, like the cacti—both epiphytic and desert—have the faculty of taking in moisture at speed and storing it for great lengths of time.

Perhaps the succulent that superficially most resembles a cactus is *Euphorbia*. Both can be tall and both have spines. But the spines of the euphorbia are quite different to those of the cacti. The cactus thorns are clustered, as has already been described, in a special organ known as an areole, whilst the euphorbia has two types of spine. In one type the two stipules beside the leaf base may become spiny, so that the spines occur in pairs; and in the other side-shoots may become woody and sharp. The flowers are, of course, totally dissimilar to the cacti. The *Euphorbias* form a large genus, growing all over the world, and including our own own "Sun Spurge," but they are by no means all succulents. This branch of the family has been transplanted to the desert as seeds by birds and winds. There it has organized itself to withstand great drought. The harder the conditions the weirder the plant, and amongst the *Euphorbias* one finds the strangest of specimens. One of the most interesting is *E. obesa*. The true form is rare as it is only found on one farm in South Africa. The seed is difficult to get as there is a male and female plant and until a plant flowers, which is not for some years, it is impossible to know which is which. Even when the seed is set one has to cover the plant with a gauze or the pods burst and the seeds get lost. *E. obesa* wants watering with much care; whilst *E. caput-medusae*, which looks like what its name implies, can do with a good deal more water. So, too, can the lovely flowering *E. splendens*. This latter plant, because it comes from the warmer clime of Madagascar, needs a little more warmth and less rest in winter. During the cold weather, without leaves it looks quite dead, but it revives at once in warmth. One thing to note here is that when a plant, and this is general of cacti or succulents, looks dead, give it warmth first and then water, and then only when it looks as if it is growing. It is just like reviving a fainting person—get him conscious before you give him anything in the way of nourishment. Most of the *Euphorbias* grow easily and look well in a room, while the large ones look very well planted out in the greenhouse.

I wish more collectors would make a garden in the greenhouse for their succulents—arranged as a rockery or planted in a bed the plants grow splendidly and in many cases flower easily. Of course, those that need a different watering could be grown on a side shelf in pots, to be placed in the rockery when they come into growth or flower. The rockery can be a continuous source of excitement and interest—so much more inspiring than a row of pots.

In addition to *Euphorbias* you can add both *Aloes* and *Agaves* to the

rockery. They both like plenty of room for their roots. They look alike, but the *Agaves*, which belong to the Amaryllis family, come from the U.S.A., while the *Aloes*, from the Lily family, are African. Connected with the *Aloes* are the *Gasterias*—*Gasteria verrucosa* is rather a lovely one—and the *Haworthias*. Of the latter there are some 200 varieties, ranging from the attractive, easily grown and well loved *Haworthia fasciata*, or *H. margaritifera*, to the highly succulent and desert *H. truncata* and *H. maughanii*. Both of the latter are very interesting and very rare.

Stapelias are also a challenge to the cultivator. Strange plants with exotic flowers, some of which have a most terrible smell, like bad fish. By this they attract the insects, especially blow-flies, for pollination purposes. A variety of allied genera—*Huernia*, *Hoodia* and *Caralluma*—are all of interest to the collector. The more uncommon Stapeliads want a little more warmth in the winter and to be kept dryish. Water well in summer when they are in full growth, but it must be very carefully given, for the stem rots quickly. Drips are fatal—but, of course, drips are fatal to cacti and succulents alike, for fungus disease flourishes in moist conditions. One of the benefits of the desert is the lack of fungus disease, and for that reason the succulent is not equipped to fight it and if subjected to it succumbs only too quickly.

We must press on, looking very hurriedly at the *Crassulas*—mostly succulent shrubs with colourful leaves, if they are kept on the dry side and in full sun. Those such as *Crassula argentea*, *arborescens* and *lycopodioides* are suitable for decoration and bowl gardening. But there are very attractive smaller and by far more difficult varieties for the collector—difficult to grow and difficult to get are *C. deceptrix*, *alstonii*, and *columnaris*. Some of these want watching as they grow in the winter and rest in summer. In one of the darkest days this January, when snow lay on the roof of the greenhouse and all the plants looked quite miserable, I saw a small, white gleam of a flower—it was my *C. pyramidalis*. It looked so lovely in that gloom. The tragedy is that a few of the rarer *Crassulas* die after flowering and I am afraid *C. pyramidalis* is one of these.

Of all the succulent plants, the Mesembryanthemum family seems to comprise the most interesting forms. It ranges from the shrubby colourful plants we used to see bedded out at the seaside—easy to grow and to propagate—to what has become known as the mimicry plants. These little plants so resemble their surroundings that one can step over them without knowing it—unless they are in flower—when the flower is often bigger than themselves.

From the usual form of opposing leaves on a woody stem of the ordinary mesembryanthemums the mimicry plant has gradually become more succulent and fleshy, the stem disappearing as the species becomes more drought-resisting. In the genus *Pleiospilos*, a plant looking like a big stone, we still have the pair of leaves sharply divided in the centre. When a fresh pair of leaves appears cease watering. These leaves live on the old ones, and no moisture is required till the old leaves die away.

The genera *Lithops* and *Conophytum* are an even more extreme form of succulent, for they have to face even harder conditions of life. The *Lithops* divided by a fissure only, look, as their name denotes, like small pebbles, and the *Conophytums* vary from two lobes to a flat button and then to the smallest pinpoint. There are many hundreds of varieties of both, with different colourings and markings all of them enchanting, but difficult to cultivate unless a great deal of attention is given to detail of when to water and when not to water. The *Lithops* and the *Conophytums* flower at different times and their times for watering are completely different. But in both species when the body goes dormant it begins to look dull and then gradually, as if it were dying, the skin of the old plant dries and gets quite papery. In the spring or summer, according to its time, the little new plant emerges from the old body. Then as it breaks its skin water may be given gradually. It is usual to keep the *Lithops* dry from November to May and the *Conophytums* from April or May to July. If the *Lithops* get over-watered they grow and even flower beautifully, but theirs is generally a quick death when winter comes. In their native state they bury themselves from the burning sun; here you find they get drawn up looking for it. These plants want plenty of light when they are resting. So do the window plants, a group of which belong to the Mesembryanthemum family. These window plants get their name from the piece of translucent skin which nature has given them to ensure that sufficient light filters through to their inside when the sand has covered the rest of their small bodies. If they did not have these windows they would die, as without light the chemical process by which the plant lives would cease. Amongst these are *Fenestraria*, *Othalmophyllum* and the lovely *Frithia pulchra*. Certain *Lithops*, *Haworthias* and *Kleinias* also have these windows.

There is not sufficient space to describe to you the many other succulents of interest—*Echeveria*, *Kalanchoe*, *Bryophyllum*, *Cotyledon*, *Sedum* and *Aeonium*—but we hope this talk will have given you some idea of the great variety of amusing and often decorative plants that are classed under the heading of succulents.

Cultivation of cacti and succulents is a collector's hobby. For people who are lucky enough to live in the country and have gardens in which they can grow many lovely flowers and shrubs, there is no need to grow succulents or cacti. But for those of us who have only a small glasshouse with coolish heating or even only a window, and yet still long to grow plants, cacti and succulents are ideal. There is an enthralling interest to learn more about these weird plants and, as we study their botany and their background, windows open for us, disclosing many landscapes of the world.

THE PRODUCTION OF HARDY OUT-OF-SEASON FLOWERS FOR CUTTING

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(*Lecture given January* 25, 1955, MR. STUART OGG *in the Chair*.)

FLOWERS in the home are today regarded by most housewives as an essential furnishing, thanks to the stimulus given to decorative art by The Royal Horticultural Society and the hundreds of horticultural and show societies up and down the country.

Many home gardens during the late spring, summer and autumn, provide their quota of flowers for the home, which the housewife supplements with the products of the commercial flower grower.

The value of the flowers produced for market from the open or under glass protection in the country runs into several millions of pounds annually, and flowers from this source supply blooms for all occasions and functions. The variety and choice is enormous, largely as a result of the new kinds and varieties raised by nurserymen and others, and introduced and popularized at R.H.S. and other shows.

The success as a cut flower of any kind or variety depends on its suitability for cutting, and use as a decoration; further, public preferences are largely responsible for the success or failure of a particular variety as a commercial flower.

It is proposed today to talk of out-of-door production of what one may term early, or out-of-season, flowers which supply the market demands during the winter and spring particularly. This early flower growing without glass protection is centred on the Isles of Scilly, Cornwall and Devon, and many of the flowers which adorn our homes during the dreary winter days come from this region.

The industry, of which I propose to give a very brief history, has grown to such an extent in the last thirty years that we have today special flower trains, in the same way that we run our vegetable specials for broccoli and early potatoes—another fascinating story of an industry's development, which may be told at some future date.

The growth of commercial flower growing in the south-west can be illustrated by the fact that between the wars Cornwall's annual output of flowers alone was 5,000 tons, and most of these found their way into the Midlands, London and the industrial North. This flower industry had small beginnings—it is reputed that the first daffodils left the Isles of Scilly packed in a hat box over fifty years ago.

The following factors influenced the industry's development :

(*a*) the favourable winter climate of the south-west
(*b*) the warm soils
(*c*) education and investigational work on crops, especially at the

Gulval Experimental Station and later at the Tamar Valley Stations

(*d*) the Commercial Shows started at Penzance in 1924 and in the Tamar Valley in 1925, aimed at not only focussing attention on this growing industry, but in improving the growing, grading, bunching and packing.

One of the slogans used, such as "the public buy with their eyes," emphasized the importance of good presentation, as well as giving the public value for money in flowers which last.

Great names have been associated with this industry's development, such as the late P. D. WILLIAMS, REV. A. T. BOSCAWEN, R. BARCLAY FOX, and stalwarts still in harness, such as F. A. SECRETT. The support and encouragement received from these great horticulturists, by the writer, ensured the success of the various undertakings. To quote two examples, the anemone as a commercial flower and pittosporum as a commercial foliage were unknown at the first Commercial Shows in 1924–1925, but the late CANON A. T. BOSCAWEN provided the anemone seed and pittosporum plants for the Gulval Experimental Station, where techniques of production and marketing were worked out. Reports and pamphlets outlined production methods, and field competitions for anemones and daffodils in conjunction with the Commercial Show (of which CANON BOSCAWEN and P. D. WILLIAMS were founder members) resulted in high quality production.

In a very short time the multi-coloured anemone was appearing as a commercial flower on all our markets.

I must pay a tribute to several of my assistants who aided me in those early days, viz. MESSRS. A. E. GUNNINGHAM, W. J. MOYSE, C. POTTER, D. MCGREGOR, R. THODAY, and E. BECKLEY, at the Gulval and Ellbridge Experimental Stations.

The setting up of a public hot-water treating plant at Gulval in 1926 did much to keep bulb stocks clean, and G. GIBSON managed a similar plant and carried out researches on the Isles of Scilly for the islanders. An effort by the writer in the Tamar Valley was not supported as it was in Gulval, and we had very reluctantly to dismantle the plant. Only after it was closed did growers realise the importance of hygiene in bulb flower growing, or regard the cost as the insurance premium paid to save loss of capital which the total or partial loss of a daffodil stock represents.

Good comes out of adversity, and we now have a first class plant at St. Dominick in the Tamar Valley which Mr. F. Rogers has erected as a private enterprise. Many growers now have their own plants, which reduces the call on the public plants. The Gulval plant when first erected in 1926 treated 100 tons of daffodil bulbs a year. The hot-water treatment has since been extended to chrysanthemums, violet runners, etc., for short periods.

Much more could be written on the history of this industry, such as of exhibits at the R.H.S. Shows of packed flowers and dry bulbs, or

displays in London stores and even in Canada, and not least the innovation of taking growers to other areas and counties to see other growers' methods. These West Country Growers' Tours, which were started in 1925, the first of their kind, were emulated as were the commercial shows, and were subsequently looked upon as an essential feature of horticultural education all over the country.

The reasons for establishing this early flower industry in the extreme south-west have been given, but, although we have favourable climate and soil factors, handicaps have to be faced, and one of the greatest of these is wind. The climatic advantage is attributable to the area's geographical position, but, although a favourable factor in production, it involves the grower in long transits with high costs. It also entails greater precision in packing which may not be necessary for a grower on the market doorstep. Long transits also preclude sendings in the warm months of the year ; hence my several references to out-of-season production. Due allowance must also be made for flower development on the journey. These considerations include the packing of the flower in a partially developed stage, as with anemones, narcissi, gladioli, irises, tulips, if they are to arrive in their full glory. With cross-sticks in our boxes holding the bunches firm in transit, due allowance must be made in head-room, as the flowers grow after packing. Brittle flowers, such as irises, may arrive with broken necks if no head-room is allowed. Arrival condition is also important, and the hardening of flowers in a cool room before packing and despatch ensures the purchaser receiving flowers which last, a factor which fosters the flower-buying habit.

To return to out-door production of flowers during winter and spring, the choice of sheltered sites or the introduction of shelter belts is essential to minimise losses from high velocity winds, which can often cause damage to flowers, even in the bud stage (i.e. narcissi). Soil-robbing hedges, such as privet and *Lonicera nitida*, should be avoided, but a great range of subjects are used in the mild Scillies and coastal areas of Cornwall, where we find such plants as *Pittosporum crassifolium*, *Olearia traversii* and *O. forsteri*, and in other areas *Escallonia*, *Griselinia*, *Veronica* 'Blue Gem,' *Euonymus japonicus*, etc.

The revenue-producing *Pittosporum tenuifolium*, if undue exposure does not impair its selling value as commercial foliage, can be used also for shelter. The natural shelter of the copse suits such crops as violets, polyanthuses, Christmas roses, etc. The form of shelter, however, most commonly used is the artificial break in its many forms, such as small-mesh wire netting; the lath, wicker, rush or brushwood hurdle, and, if properly fixed, "coir" or hop netting. The advantages of this last group of shelters is that they do not harbour pests and diseases and allow of air filtration. Further they can be removed when the crop is finished, so facilitating cultivation.

In addition to the above, some shelter is introduced by tall-growing summer crops such as Jerusalem artichokes, runner beans, sweet corn,

and the residues of these crops, if reinforced by wire, give good winter wind breaks. The practice of interposing a few rows of winter brassicas, tree mallows, etc., gives an additional break for the small cultures. No hard-and-fast rule can be laid down about soil types and manuring, as we have preferences to consider such as high lime for wallflowers, stocks and anemones, whilst other main-crop winter flowers such as narcissi, violets, polyanthuses, heaths, prefer a neutral or slightly acid medium. On general lines, however, good drainage and soils which warm up quickly are essential to success; in fact, many crops such as wallflowers and stocks are banked up, whilst many others, viz. bulbs and even anemones and violets, are grown in four- or six-row raised beds with an alley or path for harvesting the blooms, this preventing the pickers ruining soil structure in the area occupied by the crop.

Soil structure and aeration are just as important as the chemical content of the soil, and to ensure this we often sow down rye grass at ¼ oz. per square yard, which we grow on for a few months, and dig or plough under as preparation for a number of crops. Where lime is necessary we have an excellent local supply in the south-west of calcareous north coast sand from the dunes.

Most of these winter flower crops need soils well charged with gradually available nitrogen, such as well-decayed farmyard manure, compost, poultry manure, etc., which is incorporated in the top few inches by rotary cultivation, plus adequate potash (1 oz. of sulphate of potash per square yard) to ensure good flower colour and winter hardiness of the crop. Methods of cultivation have to be employed which ensure timely out-of-season production of flowers of the right kinds and varieties and, above all, blooms of quality and those which last.

Some of the events mentioned, which can now be written down as history, have given us the answer to public preferences, and this has been largely achieved by co-operation between grower, raiser and salesman in building up this industry.

In the field of production the right choice of soil as well as site are all-important. The flowers produced can be grouped under several headings :

(*a*) Flowers raised cheaply from seed, which include many plants classed as biennials, such as wallflowers, stocks, forget-me-nots, sweet williams. Longer-term plants raised from seed include polyanthus.

(*b*) Autumn sowing of plants treated as annuals include calendulas, larkspurs, annual gypsophila, godetias, clarkias, nigella, cornflowers.

(*c*) Bulbous subjects, where flowers can be regarded as interest on a large capital outlay, such as daffodils, tulips, irises, muscari, gladioli. Specialized methods of production and hygiene have to be undertaken as an assurance against capital losses, e.g. the hot-water treatment of daffodil bulbs, sprayings and rogueings.

(*d*) Flower crops raised in other ways. By tuberous root, such as the anemone which can also be flowered in the year from seed sown in March. Violets, mainly single varieties, are a typically Devon and Cornwall crop. A number of herbaceous perennials can also be produced a little earlier in the south-west.

No attempt is going to be made to give the detailed cultivation and marketing of any one flower, as more than a single lecture could be given on each main crop (as daffodils, anemones or violets). I propose to group the south-west out-of-season flowers and to give a few points which may be of special interest. Let us consider flowers from seed in the two main groups mentioned. Those sown in spring or summer and treated almost as biennials, and autumn sown crops for winter or spring flowering. In the first section we can include the anemone, 'De Caen,' which is sown in March, and will yield flowers in the mild south-west throughout the winter. Some three to four pounds of the woolly seed is required per acre. The woolly masses can be disintegrated by mixing and rubbing up with sand. As germination is slow and weeds are likely to beat the crop, we therefore incubate in moist sand for ten to fourteen days, and pinch, or "hill," seed in the drill which is immediately closed. Rows should be marked with a few radish to facilitate early hoeing.

The flame-gun, especially the hooded type, is invaluable for brushing land to destroy small weeds both pre- and post-sowing of many crops, if the germinating and surface breaking periods of the crop are carefully studied to avoid damage. The anemone is generally raised from the small roots, wrongly described as "corms," the sizes varying from 1–2 cm. to 3–4 cm., etc., planted from the end of May to August at about 80,000 to 100,000 to the acre. 'De Caen' varieties such as 'Sylphide,' 'His Excellency' and 'Mr. Fokker' are main varieties, with 'St. Brigid' for the warmer periods. Polyanthus is a crop that can be raised from seed sown in February or October in frames; other seed-raised crops include forget-me-not ('Blue Bird'), (stocks both winter-flowering and Lothian), wallflowers (Sutton's early-flowering group), sweet williams, etc. Sowing of these subjects takes place from May to early July, and here again a word on techniques is important. We find that sowing in situ with such subjects as stocks and wallflowers pays good dividends. The old method of planting out gives us a succession, and we often adopt the method of sowing four rows in the case of wallflowers and stocks, and leaving a four-row space for planting out the thinnings.

The best results are obtained with forget-me-nots and polyanthuses if sowings are made almost on the soil surface, i.e. with little or no soil covering.

The setting out of forget-me-nots, sweet williams, and polyanthuses should be done as soon as seedlings are large enough to handle. Superior blooms of wallflowers and forget-me-nots can be produced if given overhead cover and coir netting round the sides of the superstructure.

The second group of seed-raised crops covers those sown in late

summer and autumn; these must be regarded as highly speculative, such as calendulas sown during the first week in August, which in a reasonably mild winter will give pickings from November to March. The most popular varieties are 'Orange King,' 'Radio' and the art shades, although there is a limited market for 'Chrysantha.' Successional sowings may be made in autumn for later spring supplies. In all but the severest winters, autumn sowings (late August and September) of other annuals such as clarkia, larkspur, godetia, nigella, annual gypsophila and cornflower will do well, and we have had some success with tall types of antirrhinum, 'Sutton's Triumph' strain, statice, and annual scabious. These overwintered annuals fill in a gap in spring between bulbous flowers and herbaceous perennials. A few useful lines of the latter are, however, grown.

CROPS RAISED FROM UNDERGROUND STRUCTURES

The above include bulbs, tuberous roots, corms, etc. These form the backbone of this early flower industry in the warm early-production area of the south-west. The Isles of Scilly industry depends almost entirely on members of the genus *Narcissus* for its winter revenue, particularly the Polyanthus group ('Soleil d'Or,' 'Scilly White') and early trumpets such as 'Magnificence' and 'King Alfred.'

The capital costs of planting an acre are, however, high, and with daffodils of good varieties, 'Fortune,' etc., a stock value figure of £500 per acre is not overstating the case. The flowers are, however, looked upon as interest on the capital; the latter, if pests and diseases are controlled, will also appreciate in value.

At the biennial or triennial lifting, surplus bulbs can be used for extending the flower-producing areas or sold as planting stocks. The production of bulb flowers for sale and growing bulbs for the seed trade demand different methods of culture. The importance of the hot-water treatment of daffodil bulbs before replanting is the insurance premium the grower pays on his bulbs, or capital, against eelworm and fly losses. Pests such as the daffodil fly have also dictated a change in cultural methods from the six-row raised bed. Growers are now turning over to the ridge and furrow method, which enables a rebanking after flowering to be made to fill up stem cavities where the flies lay their eggs.

Before such banking a dust, such as Aldrin, should be given. Bulbous crops are generally planted in a sequence, which often starts in August with daffodils followed by tulips and irises.

Investigations at Gulval as far back as 1929 showed that bulbous structures produced in the warm winter soil of Cornwall have early-flowering characters compared with the imported article; this even applies to potatoes and has proved of considerable financial advantage to the south-western grower. A few lesser-known early bulbous structures, such as *Ranunculus*, *Ixias* and the sweet-scented *Gladiolus tristis* often prove profitable cut flowers. It is not proposed to give long lists of the

varieties of narcissi, tulips and irises grown for cutting. The merits of the various varieties can form a subject for discussion. Factors such as freedom of increase, form, pose, vigour, susceptibility to pest and disease attack and weather damage are carefully weighed up by a grower in making his selection of varieties to grow.

The last section covers crops grown by methods other than those already described; these are mainly herbaceous perennials, shrubs, etc.

Violets are an important crop in the south-west, particularly Devon, and new plantations are made annually about April, from runners or offsets planted at 15 to 18 inches square and eventually derunnered to build strong flowering crowns. Unfortunately, non-scented single varieties such as 'Governor Herrick' have ousted scented varieties such as 'Princess of Wales' owing to their harder foliage which is more resistant to red spider. With new insecticides now available, however, we hope to see a return of the better varieties. Even in the mild south-west, doubles should have the protection of frames. Violet flowering will start in October and continue until April. Here again the raised bed and picking alley is used by some growers to prevent soil consolidation and damage to the plants. Through the improved drainage we get warmer soils and better crops. This general principle applies to many of the main flower crops grown in the south-west, such as anemones, daffodils, polyanthuses. Individual row banking with wallflowers, stocks and daffodils achieves the same end. Commercial foliage does not fall within the scope of this talk, although our sendings are considerable, but a certain number of flowering shrubs find their way on to the markets from the south-west during the winter months, including white heather, camellias in variety, early rhododendrons, viburnums, hydrangeas, acacias (*A. dealbata* and *A. baileyana*, although there are several other useful species).

A few early herbaceous perennials are also grown such as *Dimorphotheca barberiae*, *Aster yunnanensis*, alstroemeria, doronicum, pyrethrum, but the stage is now reached when our season begins to overlap with "up country" areas, a condition that often arises when we get into main crop Darwin tulips. Irises and early gladioli are also grown, although we generally clear a fairly heavy crop of *Iris* 'Wedgwood' before we lose our climatic advantages.

SPECIAL TECHNIQUES

Nature has been further aided in this climatically favoured area by the new techniques largely worked out at Gulval station and in Holland for preparing the various underground structures by warming or cooling, or by a combination of both. These treatments are applied to such bulbs, corms, etc., as narcissi, tulips, iris, muscari, gladioli, or for holding back other structures such as anemones. The original work between the wars was empirical, and started as a result of a chance observation at Gulval, that daffodils flowered earlier where the soil was kept cool in summer by the shade of a tree, and this led us to experiment with

mulching and cooling bulbs. At the same time DR. VAN SLOGTEREN was working out temperature ranges. These processes have been dealt with in the *Daffodil & Tulip Year Book* and *Gulval Experimental Station Reports*. Briefly, however, bulbs are warmed in August, to aid flower development, at 68° F. to 72° F. for two weeks, followed by from six to nine weeks at 48° F. for vernalizing narcissi, tulips, muscari, irises, according to kind and variety. These treatments take place during August, September and October. The warming of certain varieties of gladioli corms also gives flowers several weeks earlier; the early 'The Bride' group, however, shows little or no response.

Prepared bulbs are planted in sheltered areas in the open in the two western counties and the Isles of Scilly, enabling growers to pick daffodils such as 'Magnificence' and 'Fortune' at the year end from the open ground, some weeks earlier than bulbs treated in the normal manner. Temperature controlled stores (of which there must be about two dozen in the south-west) have many uses. The usual temperature range is from 28° F. to 96° F. and with up-do-date air circulation and humidity controls on the most modern Frigidaire types, they can be used not only for preparing bulbs but for hardening off flowers before dispatch to market, also for taking field heat out of fruit, flowers and vegetables under certain weather conditions. When a profitable market makes it worth while, they are used for advancing flower bud development followed by hardening off. Holding flowers back at temperatures from 38° F. to 42° F. is another use for stores which have served their purpose for inducing early bulb flowering.

PICKING, BUNCHING AND PACKING

The value of flowers, when purchased by the housewife, is closely bound up with the treatment they receive during picking, watering, bunching, packing and transit. Flowers picked too young or too old will not give satisfaction to the purchaser. In most cases it is essential that they have a long drink before packing, and if at all soft, be hardened off before dispatch. This is another function of the temperature controlled store after it has been used for bulb and corm vernalization for producing earlier blooms.

Wind can often cause considerable damage even to flowers in bud, and full use must be made of weather reports to anticipate and prevent losses. Many flowers are picked in the expanding bud—irises, gladioli, anemones—but they must not be harvested too young or too green, a common mistake made with anemones, which, as a result, never develop their colour and glory. With some daffodils, to obtain the intensity of colour, the partially opened bud when packed, ensures them arriving in their full beauty. Flowers should never be finally bunched in the field, but roughly bunched, and then graded for quality, flower size, and stem length in the shed. Damaged and marked flowers should be discarded. Stem length grading is an aid in bunching, particularly as most flowers are bunched as a flat-sided bunch, and with anemones and

daffodils the flat-sided twelve-bloom bunch has four rows each of three flowers. With calendulas, six flowers, three two's is large enough. In bunching daffodils a bunching cradle is often used to ensure uniformity. The hand-sized flat bunch is also used for forget-me-not, polyanthus, etc., but a few flowers, such as violets, are bunched as posies of eighteen or thirty-six blooms with a few leaves. There is a recognized range of containers. A box 17 inches long by 12 inches wide is generally used for violets, and by some for anemones, the 20 inch long box is, however, favoured for this crop, while the 28 inch and 30 inch by 15 inch Bunting box is the most popular container for daffodils.

In all cases flowers must be packed firmly, and boxes neatly lined with PBS paper with a cross-stick to ensure that the flower bunches do not move in transit. Variety and count (which should be dozens or parts of a dozen) should be clearly indicated. I again reiterate: give the public flowers in their prime, clean, well graded, and firmly packed. This talk has no doubt convinced you, spring starts in the west and moves progressively eastwards, and those out-of-season flowers we send you in the dreary months are a reminder of the spring days ahead. The flowers displayed as commercial bunches have all been picked in the open from Messrs. Sutton's Gulval trial grounds by courtesy of that firm—anemones, stocks, forget-me-nots, wallflowers, calendulas, and daffodils.

E. A. BOWLES (1865–1954), THE MAN AND HIS GARDEN

PART I

William T. Stearn

UNDER the heading "Bowles" in A. C. FOX-DAVIES' *Armorial Families* there occurs the entry "EDWARD AUGUSTUS BOWLES, Gentleman," this in one word epitomizing the life and character of the man. For E. A. BOWLES the designation of "gentleman," not only in its narrow heraldic and legal senses of one entitled by gentle birth to bear a coat of arms and following no gainful occupation, but also in its wider connotation of a man good, courteous and honourable, was in every way most apt. He combined high intellectual and artistic gifts commanding respect with an ever kind and generous disposition that quickly won and held through the years the affection of all who were privileged to know him well, from his Sunday School boys to his colleagues on learned bodies. His wisdom and learning rested upon a rock-like integrity of character such as had made his Huguenot ancestor AIMÉ GARNAULT leave France when LOUIS XIV revoked the Edict of Nantes; his strong and simple moral sense brought out the good in others and

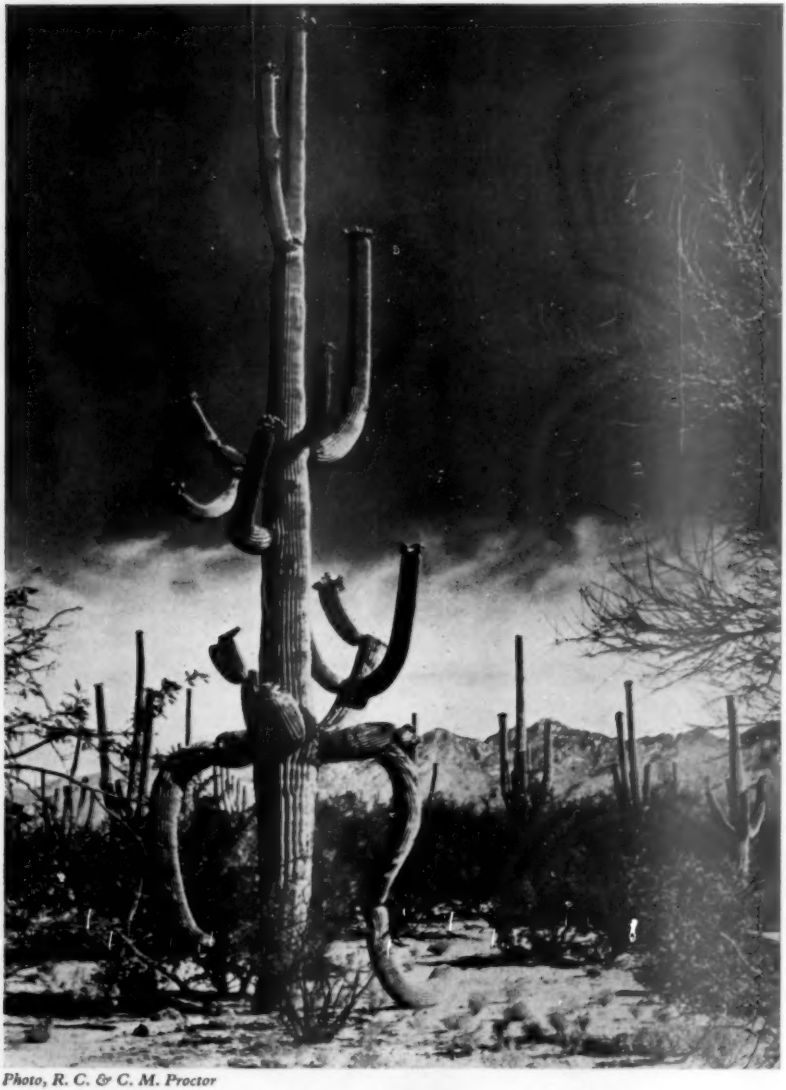
made him an effectual uncompromising witness for truth. Of him it could be truly said that he was "the soul of honesty and the enemy of humbug, a steadfast friend and no time-server," who did with a whole heart whatever he undertook. From these qualities came his authority. Hence in council and committee, no matter how feeble he had become physically as the years mounted upon him, his firm will and clear judgment gave him power to the end, and as he served unselfishly many good causes, so his death, but a week before his eighty-ninth birthday, came as an irreparable loss. The record of his long and active life is largely one of public service. Gardening and botany were by no means his only interests but ultimately they dominated the others. In May 1897, at the age of thirty-two, he became a life-fellow of The Royal Horticultural Society; he was made a member of the Society's Scientific Committee in 1902 and from then onwards to within a fortnight of his death in 1954 he gave generously of his time and experience, and latterly of his failing strength, upon one committee after another for the benefit of the Society's affairs. In mourning him we are at the same time grateful that over so many years we had him among us as an example and a friend.

EDWARD AUGUSTUS BOWLES was born on May 14, 1865, at Myddelton House, Bulls Cross, Enfield, in the county of Middlesex, and here he lived all his life; here he died on May 7, 1954. The funeral took place on May 11 at Forty Hill Church nearby. It was a sunny bright day, with ornamental cherries and crab-apples, tulips and anemones and a host of other plants in their full flush of beauty in the garden of Myddelton House that was largely his handiwork. Most of these he had himself planted; season by season he had observed them closely—few owners of large and well-stocked gardens can have known every plant of their domains so intimately—and writing of them at this time of the year he began his celebrated *My Garden* trilogy published in 1914 and 1915. The frontispiece to his first book, *My Garden in Spring*, portrays the sunny window of the morning-room, overhung in May by flowers of Wisteria, where forty years later he died. For me, who was privileged over a quarter-century to be his friend, it is a happy memory to have him linked with the verdant freshness and beauty of May, for the youthful upward surge of delight in a renewing world stayed with him to the May Sunday before his death as he talked about plants then in flower and expressed his last wishes, his mind at peace but his strength fading.

From this morning-room the lawn slopes to a large pond with skilfully planted edges, which on account of its varied green setting used to remind the much-travelled H. J. ELWES of a view in tropical Peradeniya. This pond began as a quarry for gravel during the building of Myddelton House, but its present beauty, like the rest of the garden, results largely from the care of E. A. BOWLES over many years. During his boyhood the garden was "largely filled, according to the gloomy taste of the period, with such evergreens as Common Laurel, Laurustinus and Portugal Laurel, and many self-sown Horse Chestnuts were permitted to grow up among the wildernesses and shrubberies." A few beds for

Photo, Bernard Wakeman

FIG. 61—*Agave parryi* in the gardens of SIR RALPH NEWMAN, BT., at Blackpool Gardens, near Dartmouth, S. Devon (See p. 327)



Photo, R. C. & C. M. Proctor

CACTI AND SUCCULENT PLANTS

FIG. 62—The Giant Saguaro, *Carnegiea gigantea*, growing in S. Arizona (See p. 304)

(Reproduced from *The Flowering Cactus* by kind permission of Messrs. McGraw-Hill Book Co., Inc. Copyright 1954)

Photo, R. C. & C. M. Proctor

FIG. 63—The Jumping Cholla, *Opuntia bigelovii*, in its native habitat, showing small plants vegetatively propagated from the detached joints of the older one (See p. 304)

(Reproduced from *The Flowering Cactus* by kind permission of Messrs. McGraw-Hill Book Co., Inc. Copyright 1954)

Photo, The Tello Co. Ltd.

FIG. 64—An exhibit of cacti at the R.H.S. Show Olympia, 1954, from Worfield Gardens, arranged by LT.-GEN. SIR OLIVER LEESE and LADY LEESE

FIG. 65—A stream in the British Woodland Garden

GHENT FLORALIES, APRIL 1955

Photos, J. E. Downward

FIG. 66—Polyanthuses and cherries in the British Woodland Garden

FIG. 67—Part of the formal garden from Messrs. Winkfield Manor Nurseries, for which a Gold Medal was awarded

Photos, J. E. Downward

FIG. 68—Part of the formal garden from Messrs. Hancock & Son, for which a Gold Medal was awarded

FIG. 69—Part of the formal garden from Messrs. R. Wallace & Co., for which a Gold Medal was awarded

Photos, J. E. Downward

FIG. 70—Part of the exhibit from the Kenya Horticultural Society, showing epiphytic and terrestial orchids and *Canarina* species

FIG. 71—Part of the exhibit from the R.H.S. Garden at Wisley, showing bog primulas, meconopsis and rhododendrons

Photo, J. E. Downward

summer bedding plants sprinkled the old bowling green in front of the house. Little by little BOWLES swept away this "dreary collection." Under him the garden of Myddelton House became world-famous as a repository of good, curious and uncommon plants, a centre from which they were generously dispersed to other gardens and one from which students of particular groups could often obtain for study living material available nowhere else. Out of his experience with it grew his three *My Garden* volumes, his *Handbook of Crocus and Colchicum*, his *Handbook of Narcissus* and his many contributions to periodicals. This development took place despite very unfavourable climatic and soil conditions. The garden was old when BOWLES came to it, with many big trees as a legacy from the past three hundred years or so of planting; their roots competed for all the moisture available in the thin soil overlying its deep gravel. In his *My Garden in Spring*, BOWLES went so far as to write that "climate, soil and trees contrive to make it the driest and hungriest in Great Britain, and therefore arises the line of gardening I have been driven into. It is perhaps better described as collecting plants and endeavouring to keep them alive, than as gardening for beautiful effects or the production of prize-winning blossoms. Many find the garden too museumy to please them. I plead guilty to the charge. . . . In fact I gladly give a home to that class of plant the writers in early numbers of the *Botanical Magazine* and *Botanical Register* faintly praise as being suitable for the gardens of the curious."

Many a time, returning in high summer from Cornwall, BOWLES would regret that his plants had to endure such parched conditions and that he had to spend his life contending with them, but the quick drainage nevertheless favoured the bulbous plants which he loved so well. The garden came to him not by choice but by family circumstances, which tied him to it until he had no wish to move elsewhere. Like his other possessions, intellectual as well as material, he developed and used it not selfishly but for public good. To an important extent they all derived from his Huguenot ancestry. The family connexion with this property, which has now ended, began in 1724, when MICHEL GARNAULT (1669–1746) purchased it.

The GARNAULTS were a well-to-do Protestant family of northern France. After the Revocation of the Edict of Nantes, they chose exile rather than to abandon their strong religious convictions. Five GARNAULT brothers came to England; their prominent descendants include the jurists SIR SAMUEL ROMILLY (1757–1818) and LORD ROMILLY (1802–1874), PETER MARK ROGET (1779–1807), E. A. BOWLES (1865–1954) and his cousins SIR WILLIAM JOB COLLINS (1859–1946)* and EDWARD TREACHER COLLINS (1862–1932).† E. A. BOWLES'S direct ancestor was AIMÉ GARNAULT (*d.* 1740), a merchant jeweller of Paris, naturalized as a British subject in 1700. The GARNAULTS acquired a block of Adventurers and King's shares in the New River Company founded by SIR

* Cf. *British Medical Journal*, December 21, 1946, p. 967.
† Cf. *British Medical Journal*, December 24, 1932, pp. 1167–9.

HUGH MYDDELTON (*c.* 1560–1631) to supply London with clean water. MYDDELTON did this by constructing the New River Canal, 48 miles long, 10 feet wide, 4 feet deep, from Chadwell Spring near Ware to north London. He met with considerable difficulty from certain landowners, one of whom seems to have been the owner of the property now called Myddelton House, but which was then Bowling Green House, for he evidently stipulated that MYDDELTON'S New River should not cut straight across his grounds but should bend so as not to spoil the yew hedge forming his southern boundary. MYDDELTON'S engineers were thus obliged to divert their canal and move thousands of tons of clay to build an embankment holding the New River. Of these yews eight still survive at Myddelton House along the north bank of the New River, having grown into trees up to 40 feet high. In E. A. BOWLES'S childhood a dismal shrubbery of laurels, etc., covered the ground beneath them; this he replaced by beds of bearded irises.

It was probably the GARNAULT controlling interest in the New River Company which led MICHEL GARNAULT, AIMÉ'S brother, to acquire in 1724 the Bowling Green House property at Enfield that E. A. BOWLES inherited. Certainly this interest in the New River Company formed a major source of the family income until the company was absorbed in 1904 by the Metropolitan Water Board, although the selling of books and print by the BOWLESES and of wax and tallow by the TREACHERS, E.A.B.'s other ancestors, undoubtedly contributed to the wealth which came from the selling of jewels and water by the GARNAULTS. E. A. BOWLES did none of these things, but the New River played an important part in his life as well as his garden, for his father, HENRY CARINGTON BOWLES BOWLES (1830–1918), was the last Governor of the New River Company. On the board of the company H. C. B. BOWLES had as a colleague the REV. CANON HENRY NICHOLSON ELLACOMBE (1822–1916). He it was who awakened E. A. BOWLES'S interest in gardening and from his celebrated Gloucestershire garden came many of the plants which displaced the mid-Victorian cherry-laurel and laurustinus plantations of Myddelton House. Within the garden itself the New River is a pleasant landscape feature rather than an aid to gardening. As E. A. BOWLES wrote, "of water there seems to be plenty for the New River runs through the very centre of the garden; but though it may carry many millions of gallons through it, clever SIR HUGH MYDDELTON made its clay banks so strong that even after 300 years they let no water soak away. Derived mainly from chalk wells it is so hard that one feels it would scarcely be a miracle to walk on it . . . an absolute poison for certain calcifuge plants. A liberal dose of New River water given in a spirit of kindness to a collection of dwarf Rhododendrons during a time of drought killed all but one in a fortnight."

The property acquired by refugee MICHEL GARNAULT remained in male GARNAULT hands until May 1809, when DANIEL GARNAULT III (1773–1809) died and bequeathed it to his sister ANN (1771–1812), who in 1799 had married HENRY CARINGTON BOWLES (1763–1830). They

were E. A. BOWLES's great-grandparents. One notable tree at Myddelton House commemorates her, for, as BOWLES wrote in 1914, "this ANN GARNAULT has left her mark on the garden by planting a deciduous Cypress (*Taxodium distichum*) which in spite of subsequent draining of the pond by which it stood has grown into a really fine tree." It is now (1954) about 80 feet high.

Bowling Green House, as the property was still named, thus passed from the family of GARNAULT to that of BOWLES. ANN's husband came of a line of London print-sellers and publishers, who issued at least two works connected with flowers and horticulture, namely, BATTY LANGLEY'S *New Principles of Gardening* (1728) and *The Florist, containing 60 plates of the most beautiful Flowers* (*c.* 1760), reissued as *Bowles's Florist* (1777), as well as *Bowles's Artist's Assistant in Drawing* (*c.* 1780) and *Bowles's New Collection of English Moths and Butterflies* (17—), which likewise anticipated major interests of their descendant. One of these sellers of books, prints and maps was JOHN BOWLES (1701–1779), whose son CARINGTON BOWLES (1724–1793) became a very affluent publisher, having his map and print warehouse in St. Paul's Church-Yard, London. His son HENRY CARINGTON BOWLES (1763–1830), a Fellow of the Society of Antiquaries and a friend of CHARLES LAMB, gave up publishing and bookselling and married the heiress ANN GARNAULT, having by her three sons and three daughters, and settled at Bowling Green House when it came to her by inheritance. In 1818, six years after her death, H. C. BOWLES pulled down that pleasant old red-brick gabled house and "built the present one of the then fashionable yellow brick brought from as far away as Suffolk," wherefore it became the constant aim of his great-grandson E. A. BOWLES to smother it in creepers of all kinds, notably wisteria, musk rose, parthenocissus and *Polygonum baldschuanicum*. H. C. BOWLES named "the present elegant villa" Myddelton House, but E. A. BOWLES always regretted that his great-grandfather had not spared the old house and kept the old name. Myddelton House passed on HENRY'S death to his son HENRY CARINGTON BOWLES II (1801–1852), who left no issue. At the death of the latter it then passed to a nephew, HENRY CARINGTON BOWLES TREACHER (1830–1918), father of E. A. BOWLES, on condition that he assumed the surname and arms of BOWLES. ANN BOWLES (1800–1856), sister of H. C. BOWLES II, had married in 1823 EDWARD TREACHER (1792–1863),* the TREACHERS being prosperous London wax and tallow chandlers, soap-makers and tallow-melters. Their son HENRY CARINGTON BOWLES BOWLES married in 1856 CORNELIA KINGDOM (*d.* 1911), daughter of GEORGE WILLIAM KINGDOM, R.N., Clerk of the Check at Sheerness Dockyard. E. A. BOWLES was the fourth of five children of the marriage.

Gardening and natural history did not particularly interest HENRY C. B. BOWLES. Such interests came to E. A. BOWLES from his mother and his mother's family, largely, it seems, through the influence of his

* His father, JOHN TREACHER (1755–1838), a prominent Baptist, E. A. BOWLES's great-grandfather, was a founder of University College, London.

great-grandfather on that side, the REV. ROBERT AUGUSTUS FERRYMAN (1749–1835), Rector of Iping, Sussex, who was a man of decided originality and versatility, for he is credited with planning gardens, practising taxidermy, even to the extent of stuffing a racehorse, and designing locks for a well-known jail, as a precaution, his descendants used to say, lest he should be locked up in it! One of E. A. BOWLES's uncles possessed an orchid house. He also had a maternal relative keenly interested in Lepidoptera; it is thus not surprising that insects became his first interest as a young man and that he joined the Entomological Society of London in 1894, several years before he joined The Royal Horticultural Society.

E. A. BOWLES's two elder brothers, SIR HENRY FERRYMAN BOWLES (1858–1943) and JOHN TREACHER BOWLES (1860–1887), were educated at Harrow, but he, like REGINALD FARRER, received most of his education at home. When eight years old he lost the sight of his right eye through an infection which damaged the iris and rendered the cornea opaque. Fortunately this disability did not hamper the development of his artistic skill; JOHN LINDLEY had likewise only one eye. His parents considered him too delicate to stand the rough and tumble of an English public school and until he was fifteen he shared a governess with his three years younger sister CORNELIA ANNE MEDORA (1868–1887). He spent all the time he could working in a sunny garden plot within the kitchen garden below the south bank of the New River, a plot chiefly filled with bulbous plants. Here he met his "first garden love," the genus *Crocus*. Here began that life-long interest in bulbous plants of which his *Handbook of Narcissus* (1934), *Handbook of Crocus and Colchicum* (1924 and 1952), various chapters in his *My Garden* books and his paper on Snowdrops (Galanthus) in *J. R. Hort. Soc.* (*London*) **43**: 28–36 (1918), are such valuable memorials.

In 1881 the vicar of Forty Hill became BOWLES's tutor and taught him Latin and Greek. Two years later he went to a "cramming school" where young men were prepared for the Army and University entrance examinations. He became an undergraduate of Jesus College, Cambridge in October 1884, studied theology, Hebrew and Early Church history and took his B.A. degree in 1887; his M.A. followed in 1891. His elder brother, HENRY FERRYMAN BOWLES, had been called to the Bar and had begun that public career which gained him a baronetcy. The next son, JOHN BOWLES, had become a captain in the Light Infantry. E. A. BOWLES, being of a deeply religious temperament, intended to enter the Church and was preparing to be a curate at St. Bartholomew's, London, when tragedy hit the family. JOHN, the army officer, contracted tuberculosis, and his devoted sister MEDORA caught it while nursing him; he died on October 1, 1887, she on December 27, 1887. The firstborn, HENRY CARINGTON BOWLES III, had died in 1858. Thus of five children, two remained. As the younger son, E. A. BOWLES now considered it his duty to remain at home with his grief-stricken parents. They, fearing he might likewise become a victim of tuberculosis, encouraged him to the

full in his outdoor pursuits and even let him use the conservatory adjoining the drawing-room as a home for his lizards, toads and frogs! Thus he was never ordained.

Abandonment of an ecclesiastical career, to which he had felt called, must have been a severe disappointment. Aged twenty-two, he now applied himself with zest to social work, painting and the study of natural history, particularly ornithology and entomology, His parents gave him a high-walled room some 15 feet by 13 feet on the west side of Myddelton House as a study. This remained his sanctum, his work-room, for the rest of his life. Here he kept his fine collection of botanical and horticultural books, with the book-shelves, glass cases and cabinets of insects and birds' eggs rising from floor to ceiling and almost completely hiding the walls; here as a young man he tended his salt- and fresh-water aquaria; here he reared insects; here he wrote his books and articles; here he took his meals during the Second World War, it being the only small and warm room in his vast, cold house. Myddelton House stood then in the midst of a completely rural area over which the squirearchy still exercised its traditional influence and performed its traditional duties, of which the BOWLES family was very conscious. HENRY C. B. BOWLES rebuilt the local almshouses. His son E. A. BOWLES acted as his representative in tactfully relieving distress,* for there were no state old-age pensions and unemployment relief then and fear of the workhouse haunted the ageing poor. At the same time E. A. BOWLES helped the young by setting up a night school in a house at Turkey Street lent him for the purpose by his father. Here the rough, illiterate lads of Turkey Street and Enfield Highway could spend some evenings playing games which kept them out of alehouses; on other evenings they learned to read and write, to do book-keeping, etc., and became acquainted with good literature, the interest of natural history, etc., their instruction ending with cocoa and biscuits. To this help many a local boy owed his start in life. BOWLES carried on with this school up to the First World War. On Sundays he taught in the parish Sunday School; on Sunday afternoons any interested boy was welcome to come to the great house, to roam the garden and stay to tea. It was thus natural for him to be chosen as a governor of Enfield Grammar School, an office he held until 1953. For many years he was President of Enfield Natural History Society. The affairs of the parish church at Forty Hill were likewise near his heart. From 1913 onwards, as a registered lay reader and vicar's warden, he took an active part in the

* Two letters may stand for a batch reflecting this period. Forty Hill parishioners evidently found the Christian name Augustus difficult:—

"Please Mr Gustres Bowles Sir I sorry to trouble you but would you be kindenough for to give me a bit of flanol for to make My little girl Emily to sheemys as she as sufard with the roomadex this last week and it is three years ago since you gave her the last and my husbant is only making eaight hours a day or I would not have ask you Sir Mrs N——"

"Mr Desgusting will you Please to be so king to ablige me with some monny for i having got henny monny to come home with i should be a blight to you if you can i shal be home on Satday"

services until infirmity overcame him. Well past eighty years and too blind to read notes, he would come down into the middle of the church to deliver a simple and well-constructed sermon. He particularly liked what he called the "Gardener's Collect," that in the Church of England Prayerbook for the seventh Sunday after Trinity. No-one could know E. A. BOWLES for long without realizing that here was a man whose whole life was inspired by a deeply Christian spirit; he had no ostentatious piety but the spirit of goodness permeated him. Seeing always the good in others, he made a diversity of friends and only by death did he lose them.

Social activities and numerous unobtrusive kind acts endeared E. A. BOWLES to the parishioners of Forty Hill, but it was his garden, his publications and his work for The Royal Horticultural Society that made him widely known. On his return to Myddelton House from Cambridge, he interested himself chiefly in entomology. He worked out the life histories of several species of Lepidoptera not then investigated, devoting part of the garden to their food-plants. His horticultural career can thus be said to have begun with the cultivation of weeds! His first publication was a short article in *The Entomologist* **24**: 130–1 (1891) on variation in the markings of *Papilio machaon*; he contributed other notes to the *Entomological Record* (**2**: 225; **3**: 225) and supplied J. W. TUTT with records for his monumental works on British Lepidoptera. Never dilettante, BOWLES worked hard and with success at whatever he undertook, attaining professional competence, and although one interest might later be overshadowed by others it always remained with him to broaden his judgment. Thus his early entomological experience added much to his value later as a member of The Royal Horticultural Society's Scientific Committee and Wisley Gardens Advisory Committee. During this period he learned how to stuff birds and mammals. He also developed his skill as a painter in water-colour. He received no formal art training but used to accompany an artist friend and paint the same things as he did, thus learning a professional technique.

Bitton Vicarage in Gloucestershire, where ELLACOMBE awoke young "GUSSIE" BOWLES's latent enthusiasm for gardening, possessed by 1890 the most richly stocked private garden in England. It was packed to overflowing with an extraordinary diversity of plants such as BOWLES could not then have seen elsewhere. The varied shapes of these plants appealed to BOWLES's artistic sense, for he appreciated the line of a plant as much as its colour, and the Canon gave them away generously. Moreover, the Canon possessed a remarkable library of botanical and horticultural books, to which he introduced his keen young friend. He also impressed upon him the importance of a careful naming of plants. In old age BOWLES gratefully remembered ELLACOMBE as "the foremost both in time and ability of my teachers in gardencraft."

Back at Myddelton House BOWLES began to amass a similar library for himself and to take over the care of his father's garden. The changes

that he made demonstrate his skill as a landscape gardener. Main features of the garden and the plants described some twenty-five years later in his three *My Garden* books did not exist there when he started.

In August 1895, at which time BOWLES was thirty years old and had managed the garden for five years, F. W. MEYER of Exeter wrote in *The Garden* **48**: 116 (1895) that "hardy plants of all kinds form a delightful feature in the beautiful garden of MR. BOWLES," and "not the least interesting feature is the rock garden, which, though on a small scale, contains, nevertheless, a fine collection of suitable plants." The oldest part of this rock garden dates from 1893. Most of it BOWLES built himself, that is to say, he "chose out the stone for each position, helped to move it and generally gave it the final lift or shove, or jumped up and down on top of it, to fix it in place." The rock used is Kentish rag and it stands in a meadow remote from the house. Though not spectacular, it won the admiration of REGINALD FARRER, who described it in 1914 as "a lowly piece of ground, wandering here and there in gentle natural ravines and slopes. No vast structures, but bank added to bank as the plants require it, and nothing asked of the structure except that it be simple and harmonious, and best calculated to serve the need of the little people it is to accommodate—to accommodate and not to be shown off by. For here the plants are lords and the rocks take their dim place in the background as helps and comforts." Bowles was no purist about alpine plants and did not hesitate to put in his rock garden any bush or even tree that he thought would like the place; consequently it now contains large specimens of *Magnolia stellata*, *Poncirus trifoliata* (*Aegle sepiaria*) and *Eucryphia glutinosa*.

The gravel soil of Myddelton House would never be a rose-fancier's choice, but there have long been roses scattered about the garden, particularly rose species, and the formal rose garden created by BOWLES is one of its most pleasant features. He loved old things with interesting associations and there are many such about the garden, e.g. medieval catapult stone balls dug up at Sandgate, eighteenth-century models of ostriches from nearby Gough Park, old Clerkenwell street paving stones, balusters from old London Bridge, KING EDWARD'S old pew from Sandringham, a fossilized tree trunk (probably of Araucarites), but the most pleasing of them all is "the old Enfield market cross dismissed from the market-place to make way for a KING EDWARD VII Coronation Memorial. After a year or two of unhonoured repose in a builder's yard it came here for a quiet time among the roses." At the north of this is a small paved garden originally intended for choice bulbs and backed by a wall and garden shelter built about 1910 from stone pillars likewise found in a builder's yard and old tiles, etc., picked up on the estate, so that it looked venerable and picturesque from the beginning.

Thus over the years did the garden take shape. BOWLES's association with The Royal Horticultural Society, which began in 1897, quickly brought him many new garden friends. He came to know almost every garden of note in the British Isles and from his visits continually

brought back new plants for trial. He further enriched his garden and those of friends with uncommon plants not in commerce by founding an amateur gardeners' plant exchange society which flourished between 1900 and 1910 and brought many keen gardeners together. On his light and dry soil the plants which do so well in moister gardens were quickly eliminated. Those which survive today are the result of natural selection over many years from a great diversity of plants. He also travelled abroad. This was partly occasioned by hay-fever, which drove him to the Alps. In company with REGINALD FARRER he went to Mount Cenis in 1911 and the Tirol in 1912, but he had travelled much before then, visiting Malta, Egypt, Greece and Italy in 1898, also Greece again in 1926 and 1938, when he found *Crocus aureus* at Tatoi as related in his *Handbook of Crocus and Colchicum*, 2nd ed., 100 (1952). His travels also took him to the Alpes Maritimes (in 1913), the Pyrenees and Algeria (in 1923), and he many times visited Ireland. From such journeys he often brought back plants new to English gardens; one such is *Carduncellus multifidus* collected in Algeria and figured in *Bot. Mag.* t. 9167 (1937).

REGINALD FARRER (1880–1920), a man quick to make enemies, found in BOWLES a steady friend; he read the draft of BOWLES's first book, *My Garden in Spring*, and he contributed an enthusiastic preface which incidentally caused BOWLES some embarrassment. The dedication of FARRER'S *Among the Hills* (1911) is to BOWLES: "*Ave Crocorum Omnium Rex Imperator Augustus Paterculus*" (Hail of all Crocuses the King Emperor Little Father Augustus). Later FARRER'S Kansu collections enriched Myddelton House gardens with many species which, largely through BOWLES'S generosity, have become now widely distributed. Three such FARRER plants from Myddelton House figured in the *Botanical Magazine* are *Viburnum fragrans* (*Bot. Mag.* t. 8887; 1938), *Rosa farreri* f. *persetosa* (*Bot. Mag.* t. 8877; 1938) and *Rosa filipes* (*Bot. Mag.* t. 8894; 1938). BOWLES took a keen interest in the continuance of the *Botanical Magazine*, of which he possessed a complete set, and he supported H. J. ELWES in 1921 in the negotiations which led to The Royal Horticultural Society undertaking responsibility for its publication, thereby saving the *Botanical Magazine* from extinction. BOWLES supplied *Crocus laevigatus* for *Bot. Mag.* t. 9515 (1938). Although it is not stated in the text to *Bot. Mag.* t. 9199 (1930), the plant of *Ranunculus ficaria grandiflorus* depicted there also came from Myddelton House.

(*To be concluded*)

NOTES FROM FELLOWS

Agave parryi

THE agave shown in Fig. 61 was planted in 1914 in the Blackpool Gardens near Dartmouth, South Devon, by R. L. NEWMAN, who obtained the plant from the REV. A. C. D. RYDER, of Uckfield, Sussex. The latter, in that year, stated that the plant was then at least forty years old. Therefore, the plant as planted in 1914 must have been raised in 1874, and was (in 1954) eighty years old at least. The flower spike was first observed in early March, 1954. The first flowers opened in the beginning of August. Fig. 61 shows the flower spike in mid-August, the flower spike then being, from ground level to the highest point of the flower bracts, 19 feet high. There were twenty-one flower bracts on the spike, the bracts went on flowering till the end of September, after which they started forming seed pods. Another specimen also flowered in the Blackpool Gardens at the same period as stated in 1954. Its flower spike was 18 feet and it had twenty flowering bracts. This latter specimen was a sucker off a larger specimen, and was planted as such, probably in 1915. It was therefore thirty-nine years old in 1954. The flowers of both specimens were golden-yellow tinged pale pink in bud.

In 1954 there were several small 1954 sucker plants around both flowering specimens. It was observed that the 1954 sucker plants all flowered; other sucker plants around both plants of previous years did not flower.

The flowers were cut off from all the 1954 flowering suckers, except for one flowering sucker of each plant which was left with its flowers on.

It will be interesting to see whether those suckers of which the flowers were cut off will survive, and as to whether the suckers which were left with flowers on them will live.

Records of the flowering of *Agave parryi* in England are very rare. This species is quite distinct from *A. americanus* which has frequently flowered in England. In Fig. 61, standing by the specimen is MR. J. JENKINS, head gardener, Blackpool Gardens, near Dartmouth, South Devon.

RALPH NEWMAN

Editor's Note

At a meeting of the Scientific Committee of the R.H.S. for May 19, 1942, the late MR. E. A. BOWLES reported that a plant of this species, which had grown in the open at Myddelton House (near Enfield) for the past forty years, had flowered the previous year, throwing up a spike 12 feet high. The flowers were red without and bright yellow within. Ripe seed had been secured after hand pollination. MR. PRESTON said that *A. parryi* had flowered at Cambridge, MR. BOWLES'S plant

having originally come from there, but had not produced fruit, possibly because it had not been pollinated, but had formed some bulbils in the inflorescence. The rosette that had flowered at Myddelton House had died, but offsets produced were living.

Sweet Box (*Sarcococca confusa*)

In July, 1949, you published some notes from me on the various species of *Sarcococca* in cultivation in this country. In them I mentioned that I was trying out two species, viz. *S. confusa* and *S. humilis* as hedge plants. It might be of interest to some fellows to put on record the result of these experiments. The experiment with *S. humilis* has not been a success, partly no doubt due to the fact that the site chosen was too hot and dry, but I doubt if this plant is really well adapted to growing as a hedge owing to its habit of sending out stolons which will run 2 or 3 feet underground before surfacing.

The experiment with *S. confusa* on the other hand has been eminently successful. The plant is free of the stoloniferous habit and it also takes to clipping quite kindly. I now have a dense little evergreen ornamental hedge 18 inches high bordering my terrace which is open to the N.E. wind. It sustained a little browning with the very severe cold of the N.E. gales last year but quickly filled up the dead patches and this year it has sustained no damage at all, but has flowered continuously since the middle of January and filled the air for many yards in all directions with its delicious perfume whenever the temperature was not actually below freezing point. I find it is best to clip it immediately after flowering, say in April. If clipped later one is apt to diminish the flower during the following winter. It is a slow-growing plant and only suitable for dwarf hedges, but for that purpose I can confidently recommend it to anyone who appreciates a strong fragrance borne on the air during the months of January, February and March. It propagates very easily from cuttings and also from seed.

March, 1955 L. PALMER

Bees and Tilia petiolaris

I have always considered W. J. BEAN'S opinion that this graceful lime is lethal to honey-bees is not justified. During forty years' acquaintance with a magnificent specimen at Chorleywood in Hertfordshire I had many opportunities of noticing insect activities on this tree. *T. petiolaris* blooms much later than ordinary limes. The blossoms are larger and heavier, with the result that the flowering shoots hang down, with much of the silvery underside of the leaves showing with the pale cream flowers. The whole effect is like a cascade falling from the top, which is now some 90 feet up. The scent from the mass of bloom on a warm evening is almost overpowering.

On the bee question, in dry, ideal weather during the brief blooming period, the lime is visited by hordes of bumble-bees, honey-bees and

wasps. The wasps are not interested directly in the nectar but attack the heavier bumble-bee on the tree. The contestants fall to the ground and the fight is soon over. The wasp sucks its victim dry and flies off, soon to return. I have seen scores of carcases lying alongside the grass verges, the light wind piling them in heaps. Examine what you will, they are just cases with a hole torn in the side. But I have never seen a dead honey-bee on the ground, or one being attacked by a wasp. We had for many years six to eight hives of bees within 200 yards of this tree, and in a good season took from them much honey in early August. An important point I noticed was that the last frames of honey sealed had a pale straw-coloured capping, and this honey had a distinct flavour. We always considered this to be lime honey and it was very popular.

In my humble opinion, there is nothing against planting this lovely lime.

GEORGE W. STACEY

Chorleywood, Herts.

A Hardy Maidenhair Fern

By word of mouth, by writing, and by ocular demonstration I have endeavoured to persuade gardening friends that *Adiantum venustum* is hardy in the south of England, and a fine subject for cultivation in a cool or unheated greenhouse. Alas, my advocacy has fallen on unresponsive audiences, the general opinion being that no Maidenhair Fern can be hardy. Perhaps opinions may alter now that MR. W. P. KING'S story, and an illustration of his large and beautiful specimen, have appeared in the R.H.S. JOURNAL for March.

Several years ago I exhibited a specimen of *A. venustum* at a meeting of The Royal Horticultural Society, but it received no recognition from Floral Committee B; the plant had a diameter of about 2 feet and was in a large 48-sized pot, and I related in writing that it had endured 8° of frost on two occasions, without harm. A nurseryman regarded it as a nice plant, but of no commercial value!

The late MR. A. J. MACSELF grew *A. venustum* successfully in the open at Reading and he sent me a small piece after we had discussed the merits of the species. Failing a congenial site out-of-doors plants may be grown in well-drained pans, in a compost containing a large proportion of leaf-soil. My largest specimen has a diameter of about 1 yard. I hope MR. HANGER will, in due course, bring the Wisley specimen to the R.H.S. hall, where, with wider knowledge, the Floral Committee may give it that favourable consideration which would advertise the value of a really hardy Maidenhair Fern of the *A. cuneatum* type.

CHARLES H. CURTIS

Brentford.

PLANTS AND PROBLEMS XVII

CONTROL OF WATER WEEDS

Question. We have a large pond in our garden which of late years has become full of pond weed and other long-stemmed water weeds. As the plants grow so quickly we are at a loss to know how we might control them. Can you please help?

Answer. A reasonable control of *Potamogeton* spp. and long-stemmed water weeds can be obtained by cutting the stems with a grass hook tied to the end of a long pole or bamboo cane. As the stems of these weeds are brittle they can soon be severed, and swept off the surface of the water with an inverted "Springbok" rake as they float to the top. If this method of control is adopted it is best done in the early summer and it must be repeated as soon as any new growth is seen. By this means it is possible to obtain a reasonable control in a season.

Finally, we would make the point that a pond can only remain an attractive feature of a garden if a balanced plant and animal life is established in the water. Thus, after *any* weed is eliminated consideration must be given to the maintenance of a stock of fish and of desirable aquatic plants such as water lilies.

UNFRUITFUL PLUM TREES

Question. There are only two plum trees in my garden—'Coe's Golden Drop' and 'Jefferson.' I chose these as being two of the best dessert plums but to my dismay they bear little or no fruit in spite of flowering well every year. They flower simultaneously and should therefore be adequately cross-pollinated. Can you offer a solution to this problem as the trees are occupying valuable ground. I would add that my garden is some distance from any other fruit trees.

Answer. Unfortunately your combination of varieties happens to be one of the isolated cases in plums which is unfruitful. 'Coe's Golden Drop' and 'Jefferson' are not compatible with one another and the only answer is to plant another variety close by to act as a pollinator for each of them. 'Denniston's Superb,' 'Early Transparent' and 'Early Laxton' are all suitable for this purpose and your existing trees would be suitable pollinators for any of them. In any case 'Denniston's Superb' and 'Early Transparent' are themselves self-fertile.

BUSH FRUITS—WEED CONTROL

Question. I have recently purchased a small mechanical cultivator. Would it be safe to use this for weed control between my rows of bush fruits and raspberries as well as in my small orchard of apples, pears and plums?

Answer. If your currant and gooseberry bushes are at the normal planting distance used for private gardens (usually about 5 feet square) it would not be advisable to use the cultivator between them. Black currants in particular form a mat of surface roots which would suffer severely as a result of any such cultivation. In any case it would

prove difficult to manoeuvre the machine between mature bushes without damaging them. Ground alongside raspberry rows could be gone over providing you keep a safe distance away—say 18 inches to 2 feet—on either side. An annual spring mulch, if applied thickly enough can do much to smother weeds, any that do arise being removed by hand or with a hoe. The roots of all these plants extend to at least as far as the spread of their branches and the less they are disturbed the better.

RED CURRANT LEAVES BLISTERED

Question. I am enclosing some shoots of 'Versailles.' These have been bearing well for the last three years but recently this blistering has appeared on the leaves.

Three years ago this condition became so bad in a lower cage that I destroyed all the bushes. Now it has appeared in the top cage. 100 yards away: the plants were quite clean until a few weeks ago. Is there anything which can be done about it?

Answer. The reddish-brown blisters on the leaves have been caused by the red currant blister aphid, *Cryptomyzus ribis* L. The aphids hatch in spring from the overwintering eggs and their feeding on the under surface of the leaves causes the blisters to appear on the upper surface. In early summer they migrate to a weed host (hedge woundwort) and winged forms return to currants in the autumn in order to lay eggs on the shoots.

It is not worth while controlling the pest at this time of year (June) since the aphids are about to migrate. In any case they are well protected beneath the curled leaves. In future a 5 per cent. tar oil winter wash should be applied in December or January to control the winter eggs. Alternatively, a DDT miscible (emulsion) or nicotine wash may be applied at the end of April to control the active stages. It is not necessary to adopt such drastic measures as destroying the bushes.

ASPARAGUS BEETLE

Question. My asparagus beds are becoming infested by these small, yellow-spotted beetles, a sample of which is enclosed. They attack my asparagus at ground level or just below and later are to be seen on the foliage. Can you tell me how best to destroy them?

Answer. The specimen is an Asparagus Beetle, *Crioceris asparagi*. Both adults and larvae cause damage to asparagus beds by eating and disfiguring the heads and later they feed on the stems and foliage. Often attacked shoots become bent and woody.

The adults appear in May and the spindle-shaped eggs are deposited on the heads and shoots in early June. They are placed on end, either singly or in rows. After about a week the black-headed, slate-grey grubs appear and feed for about two weeks before pupating just beneath the soil surface. From these, adults emerge two or three weeks later.

There are usually two, occasionally three, generations each year, the adults of the last brood hibernating in the soil or other sheltered situations.

The best control is achieved by spraying or dusting with DDT. However, it is inadvisable to use this substance at cutting time; instead a non-poisonous insecticide, such as pyrethrum, may be used. Both insecticides should be diluted according to maker's instructions.

IRIS LEAF SPOT

Question. On my Irises Leaf Spot disease occurs every year. Am I correct in thinking that it does them little harm or should I take measures against it?

Answer. Leaf Spot (*Didymellina macrospora*) which causes the well-known oval-shaped brown spots with a yellowish margin on iris leaves is very common in Great Britain but does not seem to cause serious injury to well-grown plants except in wet and humid localities. In the drier areas and if the plants are growing on a well drained sunny site the spot does not usually show much before flowering time, but in the west or even in wet localities in the south it may be a nuisance early in the season. For the drier districts it is usually sufficient to clean up the beds in autumn and remove the older and badly diseased leaves for burning. A similar cleaning up can be done in spring when the beds are tidied and a dressing of fertilizer pricked in the surface. Where the disease is more serious it would be useful to spray when growth commences in spring with a colloidal copper spray in which a good "spreader" is included and to repeat this if considered necessary.

DELPHINIUM MILDEW

Question. How serious is delphinium mildew? It seems to come on my plants only after they have finished flowering.

Answer. In some localities powdery mildew on delphiniums (*Erysiphe polygoni*) appears late in the season, but whether it comes early or late we consider it serious enough to warrant steps being taken to check its spread. The white coating made by this mildew on the leaves and flower stems weakens the plant and often delays flowering and deforms the spikes. Even where the mildew appears late in the season it cripples the second growth and this has the effect of weakening the plant and reducing its vigour. The result is that next season's buds forming at the base of the plant are not so robust and the whole plant may steadily decline. Sprays which can be used against this mildew are lime sulphur, ¼ pint in 2 gallons water, or colloidal copper according to maker's instructions. In each case make sure a spreader is included with the spray.

There are, of course, many varieties now listed as highly resistant to mildew and where the disease is severe it would be wise to grow such varieties as far as may be possible.

WISLEY TRIALS, 1954

SWEET WILLIAM

Thirty-two stocks of sweet william were received in 1953 for trial at Wisley. The trial was sown on June 15, 1953 and sixty plants of each stock were planted on July 23, 1953. The long mild autumn of 1953 encouraged sweet william rust (*Puccinia arenariae*) and fortnightly sprayings of colloidal copper were necessary to control this disease.

The trial was inspected by a sub-committee of the Floral Committee A on June 22, 1954 and on its recommendation the Council of The Royal Horticultural Society has made the following awards to sweet williams. The number in brackets after the description of the variety was that under which it was grown in the trial.

Flowers pink

PINK BEAUTY. (Sent by Messrs. Watkins & Simpson Ltd., 27 Drury Lane, London, W.C.2.) **A.M.** June 22, 1954.—Plant 2 feet high, bushy, erect; inflorescence 5 inches across, compact; flowers 1 inch diameter, single, freely produced; petals broad, serrated, Camellia Rose (H.C.C. between 622/1 and 622). [5.]

PINK BEAUTY IMPROVED. (Introduced and sent by Messrs. Carter's Tested Seeds Ltd., Raynes Park, London, S.W.20.) **A.M.** June 22, 1954.—Plant 1¾ foot high, bushy, erect; inflorescence 5 inches across, compact; flowers 1 inch diameter, single, freely produced; petals broad, serrated, Camellia Rose (H.C.C. between 622/1 and 622). [2]

Flowers red

SCARLET BEAUTY. (Raised, introduced and sent by Messrs. Watkins & Simpson Ltd.) **H.C.** June 22, 1954.—Plant 1½ foot high, bushy, erect; inflorescence 3½ inches across, compact; flowers ¾ inch diameter, single, freely produced; petals broad serrated, a vivid velvety red near Orient Red (H.C.C. 819) with some darker flowers. [8]

Flowers mixed colours

DUPLEX. (Raised, introduced and sent by Messrs. N. V. Sluis en Groot, Enkhuizen, Holland.) **A.M.** June 22, 1954.—Plant 2¼ feet high, bushy, erect; inflorescence 3¾ inches across, very compact; flowers ⅝ inch diameter, double, freely produced; petals broad, serrated, a good mixture including white, pale pink, crimson, dark crimson, cerise, mauve, magenta, harlequin and auricula-eyed. [29]

HARRISON'S DOUBLE. (Raised, introduced and sent by Messrs. Harrison & Sons (Leicester) Ltd., St. James Street, Leicester.) **H.C.** June 22, 1954.—Plant 2 feet high, bushy, erect; inflorescence 3 inches across, compact; flowers 1 inch diameter, mostly double, freely produced; petals broad, serrated, mixture includes white, pale pink, rosy pink, cherry red, pale lilac and magenta. [28]

SOHAM GLORY. (Raised, introduced and sent by Mr. J. W. Boyce, Station Rd., Soham, Ely, Cambridgeshire.) **H.C.** June 22, 1954.—Plant 2 feet high, bushy, erect; inflorescence 3½ inches across, compact; flowers $\frac{9}{10}$ inch diameter, mostly double, freely produced; petals broad, serrated, mixture includes white, pale pink, rosy pink, cerise, magenta and purple. [26]

SUPER DUPLEX. (Raised, introduced and sent by Messrs. N. V. Sluis en Groot.) **H.C.** June 22, 1954.—Plant 1 foot high, bushy, compact; inflorescence 3 inches diameter, very compact; flowers ⅝ inch diameter, single and double; petals broad, serrated, mixture includes white, pink, pale rose, rose, cerise, lilac pink, purple and white, and crimson and white. [31]

AUTUMN-SOWN ONION

Twenty-five stocks of onion were received in the autumn of 1950 for trial at Wisley. The trial was sown three times, namely on August 25, 1950, on August 28, 1952, and on August 19, 1953. In each sowing it was not possible to obtain a satisfactory number of plants of Onions 'Crystal Wax,' 'Giant Rocca,' and similar varieties, and it would appear that these varieties, mainly of American origin, are not suitable for autumn sowing at Wisley.

The trial sown in the autumn of 1953 was planted out on March 24, 1954 in ground which was double dug during the winter and in which a generous dressing of farmyard manure was incorporated. A base dressing was given of 2 oz. per square yard of sulphate of potash.

The trial was inspected finally by a sub-committee of the Fruit & Vegetable Committee on August 31, 1954, and on its recommendation the Council of The Royal Horticultural Society has made the following award.

The number in brackets after the description of the variety was that under which it was grown in the trial.

SOLIDITY. (Raised, introduced and sent by Messrs. Sutton & Sons Ltd., Reading, Berkshire.) **A.M.** August 31, 1954.—Plant vigorous; bulbs 3¾ inches diameter, 2½ inches deep, round flattish shaped; outer skin light straw yellow, inner white, average weight 10 oz., keeps well. [18]

RHUBARB

A Collection of Rhubarb is maintained at Wisley and now consists of some 78 stocks. It was replanted in November 1952. No sticks were pulled during 1953 and on May 20, 1954 the collection was inspected by a sub-committee of the Fruit and Vegetable Committee and on its recommendation the Council of The Royal Horticultural Society has made the following awards.

The number in brackets after the description of the variety was that under which it was grown in the trial.

MACDONALD. (Raised by the Horticultural Department, Macdonald College, Canada, introduced and sent by George Appleton, Esq., and also sent by Messrs. John McGeorge Ltd., 176, Bruntsfield Place, Edinburgh.) **F.C.C.** May 20, 1954.—Described R.H.S. JOURNAL 75, p. 42 (**A.M.** 1949). [42, 47]

VALENTINE. (Sent by Messrs. John McGeorge Ltd.) **F.C.C.** May 20, 1954.—Described R.H.S. JOURNAL 75, p. 42 (**H.C.** 1949). [49]

CRIMSON PERFECTION. (Sent by The Royal Horticultural Society's Gardens, Wisley, Ripley, Woking, Surrey.) **A.M.** May 20, 1954. Stalks 18 inches long, 1½ inch across, ⅝ inch deep, concave on upper surface, smooth, red in young stages, red flushed green in mature sticks, flesh red flushed green, 6 inches high on April 9. Leaves 23 inches wide, 21 inches long, heart-shaped, pointed, dark green. [25]

CRIMSON QUEEN. (Raised, introduced and sent by Messrs. Kelway & Son Ltd., Langport, Somerset.) **A.M.** May 20, 1954.—Described R.H.S. JOURNAL **56**, p. 137 (**H.C.** 1929). [11]

EDINA. (Sent by J. Rhodes, Esq., N.D.H., T.O.B.2, Whiteknights Park, Reading, Berks.) **A.M.** May 20, 1954. Stalks 25 inches long, $1\frac{3}{4}$ inch across, $1\frac{1}{16}$ inch deep, concave on upper surface, smooth, red, flesh green, 6 inches high on March 28. Leaves 23 inches wide, 22 inches long, heart-shaped, pointed, dark green. [14]

THE STREETER IMPROVED. (Raised, introduced and sent by Mr. F. Streeter, V.M.H., The Gardens, Petworth Park, Petworth, Sussex.) **A.M.** May 20, 1954. Stalks 24 inches long, $2\frac{1}{16}$ inches across, $\frac{1}{8}$ inch deep, concave on upper surface, smooth, red, flesh green, 6 inches high on April 19. Leaves 23 inches across, 20 inches long, heart-shaped, pointed, dark green. [37]

DAW'S CHAMPION. (Raised by Mr. Daw, introduced and sent by W. Poupart, Esq., V.M.H., North Weylands Farm, Walton-on-Thames, Surrey.) **H.C.** May 20, 1954. Stalks 21 inches long, $1\frac{3}{4}$ inch across, $\frac{5}{8}$ inch deep, concave on upper surface, smooth, green flushed red, flesh green, 6 inches high on April 11. Leaves 21 inches wide, 17 inches long, rounded heart-shaped, dark green. [26]

FENTON SPECIAL. (Raised by Mr. Fenton and sent by F. G. Smith, Esq., Stockbridge House Experimental Horticulture Station, Cawood, Selby, Yorks.) **H.C.** May 20, 1954. Stalks 24 inches long, $1\frac{1}{2}$ inch across, 1 inch deep, concave on upper surface, smooth, upper surface green flushed red, lower surface red, flesh green, 6 inches high on April 5. Leaves 21 inches wide, 21 inches long, heart shaped, pointed, dark green. [61]

SHALLOT

Ten stocks of shallot were received in 1954 for trial at Wisley. Twenty-five bulbs of each stock were planted on February 25, 1954. The spacing between bulbs was 15 inches each way. The site was prepared by double digging in the winter and during the digging a generous dressing of farmyard manure was incorporated. A base dressing was given of 2 oz. per square yard of both bone meal and hoof and horn and 1 oz. per square yard of sulphate of potash.

The trial was inspected by a sub-committee of the Fruit & Vegetable Committee on August 31, 1954, and on its recommendation the Council of The Royal Horticultural Society has made the following awards.

The number in brackets after the description was that under which it was grown in the trial.

WATT'S EXHIBITION. (Raised by W. Watts, Esq., 93 Banbury Road, Brackley, Northants, introduced and sent by Messrs. Lee & Evans, 5 The Arcade, Northampton.) **A.M.** August 31, 1954 as a variety for show purposes. Plant vigorous; bulbs 2 inches diameter, 2 inches deep, oval to globe shaped; outer skin brownish-red, inner white; weight of average-sized bulb $2\frac{1}{4}$ oz.; from twenty-five bulbs the total crop weight was 17 lb. 12 oz. [7]

LONG HYDE. (Introduced and sent by H. Peter Weaving, Esq., Long Hyde House, Nr. Evesham, Worcestershire.) **H.C.** August 31, 1954, as a variety for pickling. Plant vigorous; bulbs $1\frac{9}{16}$ inch diameter, $1\frac{3}{4}$ inch deep, oval shaped; outer skin brownish-red, inner white; weight of average-sized bulb $1\frac{3}{4}$ oz.; from twenty-five bulbs the total crop weight was 17 lb. 8 oz. [10]

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1954 AND 1955

Begonia × **'Corallicta' A.M.** March 22, 1955. A free-flowering hybrid raised from the cross *B. corallina* × *B. albo-picta*, suitable for the warm greenhouse. It has erect, branching stems bearing spreading, narrow-lanceolate, slightly oblique leaves about 5 inches long, of a pale lustrous green marked with small, silvery spots. The flowers are 1¼ inch long, with small, cupped corollas and winged ovaries, coloured Geranium Lake (H.C.C. 20/2) and are carried in spreading axillary panicles of about sixteen. Exhibited by the Director, Royal Botanic Gardens, Kew.

Begonia manicata A.M. February 8, 1955. A very handsome flowering plant for the warm greenhouse, introduced to cultivation from Mexico in 1842. It is a rhizomatous species and has large, obliquely ovate, fleshy, rich green leaves fringed with red hairs, and tall, branching panicles of small light pink flowers. Exhibited by the Director, Royal Botanic Gardens, Kew.

Clerodendrum petasites A.M. March 22, 1955. An easily-grown and vigorous shrub for the cool greenhouse, introduced from S.E. Asia over a century and a half ago. It has broad-ovate, strongly-veined, dull dark green, downy leaves 5 inches long. The inflorescence is a terminal, dense panicle 8 inches long, of long-tubed, white, rose-flushed flowers an inch across. Exhibited by L. Maurice Mason, Esq., Talbot Manor, Fincham, King's Lynn.

Clerodendrum splendens A.M. January 25, 1955. A shrubby species native to Sierra Leone, introduced in 1839 and requiring stove house treatment in this country. It has broadly-ovate to oblong-cordate leaves up to 5 inches long, and terminal panicles of vermilion (H.C.C. 18) flowers. The corolla is tubular below with a flattened five-parted limb an inch wide, from which the conspicuous red stamens are long-exserted. Exhibited by L. Maurice Mason, Esq., Talbot Manor, Fincham, King's Lynn.

Hamamelis 'Jelena' A.M. February 8, 1955. A seedling variety of unspecified parentage. The flowers are of a rich colour which at a distance, in sunshine, might be described as orange. Matched against the Horticultural Colour Chart the curled and crimped petals are found to be Jasper Red (H.C.C. 018) at the base, paling to Yellow Ochre (H.C.C. 07/1) at the tip. Exhibited by The Director, Arboretum de Kalmthout, Belgium.

Montbretia 'Emily McKenzie' A.M. October 5, 1954. It is many years since such a fine and distinct Montbretia as this has been shown before the Floral Committee. The individual flowers which are widely expanded measure from 2½ to 2¾ inches across and the larger perianth segments are $\frac{7}{16}$ inch across at their widest part. The colour is a shade of

Orpiment Orange between 10/1 and 10 H.C.C. Three of the segments have a central blotch of Chrysanthemum Crimson (H.C.C. 824) at the base and the other three segments have two opposite marginal blotches of the same colour towards the base. The spikes which grow 2 feet 6 inches tall are well furnished with flowers. It is claimed that the plant needs no protection whatsoever and can be left in the ground all the year round. Raised by K. McKenzie, Esq., and shown by L. Appleby, Esq., River View, Woodcroft Road, Wylam, Northumberland.

Pelargonium 'Harry James Rawlings' A.M. September 22, 1954. This zonal pelargonium resulted from a cross between the varieties 'Salmon Crampel' and 'Banbury Cross.' It is of good compact habit and the large, broad, flattish trusses carry many flowers, the largest of which measure 1¾ inch across. The colour is Scarlet (H.C.C. 19/1) shading to cerise-salmon at the base of the petals. Raised and exhibited by Mr. Fred Rawlings, Vineyard Nursery, Banbury, Oxon.

BOOK NOTES

"Crop Protection." By G. J. Rose (1955). 8vo. 223 pp. Illus. London (Leonard Hill.) 30*s*.

The protection of crops is a subject of world-wide interest and an increasing number of authors are turning their attention to it. With the availability of large stocks of expensive chemical substances and costly equipment that must be used to keep the wheels of industry turning, every possible market must be sought. Pest, disease and weed control is equally important in the tropics or in the temperate regions when economic conditions justify it, so an orderly presentation of up-to-date information is bound to be welcomed.

Mr. Rose has considered these various aspects of his subject and has written what he calls an attempt to integrate the achievements of biologist, chemist and engineer and to make them intelligible to the practical agriculturist.

He has been quite successful in those sections dealing with the chemical substances used in crop protection and in the machinery for their application.

With the embarrassingly long list of materials with which he is faced today, the grower will welcome the information given here about insecticides, fungicides and weed killers and will most certainly be interested in the full descriptions and explanations of the systems available for their application.

Unfortunately, the author has dispensed with references or bibliography so the interested reader cannot readily follow up a subject; much of the introductory matter is trite and tedious, and the legends to some of the coloured illustrations need revision—notably Fig. 5 where the larvae figured are those of a sawfly and not of a moth as stated in Fig. 7 where it states that the eggs (of pea moth) are laid *inside* the pod—which is not the case.

After perusal of the book most readers will agree with the author that "chemicals with remarkable properties have been produced and fine apparatus has been designed to apply them." For ready reference to chemicals and apparatus, through its useful index, Mr. Rose's book well merits its place on the gardeners' bookshelf.

H. W. MILES

"Shrubs for the Rock Garden and Alpine House." By Royton E. Heath. Royal 8vo. 191 pp. Illus. (Collingridge.) 42*s*. 0*d*.

From the rather surprising environment of the Savoy Hotel, where he has worked for twenty years and where he is now a floor manager, Mr. Heath has developed a love for alpine and rock-garden plants which has induced him to amass a fine collection of them in his garden at West Wickham, in Kent. Like many enthusiastic amateur

gardeners, Mr. Heath finds added interest in exhibiting his treasures and has scored signal successes at the specialist shows of the Alpine Garden Society.

This book, the second from Mr. Heath's able pen, fills a long-felt want on the gardener's bookshelf. There is a growing interest in shrubs of all kinds, and information concerning the many fascinating pygmy species and varieties has had to be sought in a multitude of volumes and I am grateful to Mr. Heath for having brought so much useful information competently within two covers.

The book, of 191 pages, is divided into two parts and seven chapters. Part One contains four chapters, dealing respectively with propagation, transplanting, planting and repotting, soils and composts, and pests. Part Two, after an introductory chapter, details a list of dwarf conifers followed by a remarkably complete alphabetical list of other dwarf shrubs, with adequate and well-phrased descriptions.

The numerous illustrations are clear photographs, mostly, I suspect, the work of Mr. Heath himself, who adds a keen interest in photography to his other activities. A few accurate line drawings usefully illustrate important points in the chapter on propagation and identification. Although the book is rather expensive it is well worth the two guineas asked for it and it is likely to remain the standard reference book on its subject for some time to come.

WILL INGWERSEN

"Successful Begonia Culture." By F. J. Bedson. 84 pp. Illus. (W. H. & L. Collingridge Ltd.) 15*s.* 0*d.*

This book deals with a very varied genus that is one of the most useful and decorative of our garden plants, of which one kind or another provide flowers, or foliage, or both, the whole year round. The author has undoubtedly a good knowledge of the subject and has dealt with it in a most interesting as well as practical way, giving a good account of the history of the genus, and of the men of the past who have played such an important part in the production, and improvement, from the early days of its introduction into this country.

The work is divided into various sections, dealing with the important part each plays in the garden: the tuberous-rooted, the most popular section of species and hybrids; the valuable winter-flowering kinds; rhizomatous and fibrous-rooted. The author deals very fully with each group, their habitat, introduction, origin and the parentage of the many beautiful hybrids (although on p. 19 the parents of 'Gloire de Nancy' are given as *B. Lemoinei* × *boliviensis*, and on p. 23 given as *B. Davisii* × *Pearcei*).

The cultivation of all the groups are clearly and fully dealt with, as also are the various methods of propagation, as well as pests and diseases, while useful hints on hybridization and packing for transport have not been overlooked.

The book is well printed, and the many illustrations are excellent, the nomenclature is good, although a number of specific names, as *Bertinii*, *Baumannii*, *Bunchii*, *Froebellii*, *Roezlii*, *Scharffii*, *Sutherlandii* and *Verschaffeltii*, to mention some, end with a single *i*, instead of the double *ii* as usually spelt, but this is a minor detail.

The book will be a valuable addition to all gardeners' libraries, being correctly titled, for all who follow the advice it gives should be able to "Cultivate begonias successfully."

F. G. PRESTON

"A Woodman's Diary." By J. D. U. Ward. 352 pp. Illus. (Routledge and Kegan Paul Ltd.) 21*s.*

This is the diary kept over a period of years by an observant countryman working in the woods. While there is much to interest the forester it should have a wider appeal to many countrymen. Mr. Ward ranges over a great variety of subjects, but throughout he writes with a clear and readable style and I have enjoyed these notes and can recommend them to others interested in forestry or woodland life.

P. M. SYNGE

"Fruit from Trained Trees." By Stanley B. Whitehead. 151 pp. Illus. (J. M. Dent & Sons Ltd.) 10*s.* 6*d.*

Some of the trained forms of fruit trees are still popular in spite of the decline of the private walled gardens in which they were so prominent. Undoubtedly many more would be grown if only people knew how to train them. This little book is certain to prove very useful to such would-be enthusiasts it being the only one the reviewer knows

that is solely devoted to trained trees. The build-up of cordons, espaliers, fans and a number of other types is simply explained and illustrated although it is doubtful whether the more complicated ones such as arcure and losange espaliers will appeal to many. Bush fruits, grape vines and bramble fruits, as well as tree fruits, are included and each chapter deals with many aspects of the successful growing of the particular fruit in question. The book also contains plans of suggested layouts for the fruit garden, although the initial cost for the trees in the largest of these would be frightening to most people. A useful index will be found at the end of the book.

E. G. GILBERT

"Grasses." By C. E. Hubbard. xii + 428 pp. Illus. with line-drawings. (Penguin Books.) 3*s*. 6*d*.

This eagerly awaited book on British Grasses, by C. E. Hubbard, is assured of deservedly wide appreciation. Each of the 152 species found in the British Isles is illustrated by full page line drawings in which the habit of the species, as well as the outline of the several parts of the spikelets, is depicted. The opposite page to the drawings is occupied by the description of the grass in simple language, in which the few technical terms used should be easily acquired by any serious reader.

In addition to the description, much information about the uses to which the individual grasses can be put is also given, as well as notes on distribution, horticultural value, and so forth.

All this would be of limited value to the amateur, were it not for the liberal provision of aids to identification. These take the form of dichotomous keys to the species when in flower, when sterile or when seeds only are available. In addition, the species are grouped under headings, such as, cereals; herbage grasses, a section in which much information is given about the best strains and species for pasture; soil-binders; lawn grasses, etc. There is a key to the grasses used on lawns, and several pages, which will appeal to the gardener, on ornamental grasses. The veriest tyro should be able to "run down" his specimen with ease, and if he cannot, there is no hope for him, and he had better confine himself to the dicots! The book is provided with two exhaustive indexes, one to the common and one to the scientific names.

Altogether this is an admirable book, and one could only wish that it had been printed on better paper and provided with a more durable cover, but at 3*s*. 6*d*. it is wonderful value for money.

N. L. BOR

"Camellias in the Huntingdon Gardens." By William Hertrich. 380 pp. 8vo. Illus. (The Huntingdon Library, San Marino 9, California). $10.

The tremendous wave of interest and enthusiasm over Camellias in the United States of America is exemplified in the latest, lavishly produced book *Camellias in the Huntington Gardens*. The introduction gives one a short history, and hints on camellia culture, cultivation and propagation, etc., whilst the remaining 90 per cent. of the book is devoted to the full description of 249 "cultivars" with their attendant plates. The latter form the chief feature of the book, being excellent clear black-and-white reproductions, which give full justice to their respective blooms. The accompanying description goes into full details, the colour being described with reference to The Royal Horticultural Society's Colour Chart, which is in many ways better than a possibly inaccurate colour plate. Also incorporated are details of their leaf form, this latter feature being further amplified by several plates illustrating different types and shapes of leaves—a way of identification that is not used nearly enough.

Many of the cultivar names—like 'Strawberry Blonde' are not known in this country, but others are quite familiar, and with the synonyms the reader will find himself amongst a few old friends.

GILES LODER

"Modern Aspects of pH." By James Small, D.Sc., Ph.C., F.R.P.S., M.R.I.A., F.R.S.E. ix + 247 pp. (Baillière, Tindall and Cox.) 30*s*.

In his book *pH and Plants*, published in 1946, Professor Small pleaded for the introduction of new pH standards, based on hydrogen-ion activity rather than hydrogen-ion concentration, and chosen with due recognition of the limits of accuracy obtainable in the practical determination of pH values. The official adoption of such standards in 1950 has given him a new viewpoint from which to re-examine many of the subjects discussed in the first book.

A new chapter outlines the pH control measures needed in some industrial processes, but the rest of the book is devoted to the study of plants and their environment. Professor Small covers a wide field—buffer systems; cell-sap; succulents; hormones; enzymes; micro-organisms; environment, including pH values of soils and water—and the new information he has gathered together will be welcomed by those botanists whose chemistry is of the high order that the author demands of his readers.

The grower who turns to the soils section for enlightenment on the relations between soil pH and fertility is liable to disappointmnet. Professor Small rightly says "soil chemists know quite a lot about the availability or otherwise of necessary nutrients under different pH conditions, and also about the toxicity of excessive availability of certain trace elements," and readers may wonder why they have not been helped to share this knowledge.

M. GREENWOOD

"Half Century of Iris." By W. J. McKee and J. R. Harrison. 248 pp. (W. J. McKee, Worcester, Mass.) $4.

This is an extremely specialised book and likely to be intelligible only to those who are already well acquainted with iris breeders and breeding in the United States. To such it will be of great interest. It deals mainly with tall bearded irises and consists of a number of articles on iris culture and hybridising by Mr. W. J. McKee, an iris hybridiser of thirty years standing, and others by Professor J. R. Harrison, a grower of like experience, who discusses the breeding of various colour groups within this section of the genus. Extensive pedigrees are given representative of the colour groups discussed. The last 100 pages are devoted to an "Historic Record of Hybridisers," enumerating these ladies and gentlemen in alphabetical order and listing and considering their achievements in iris-breeding. The book is written in the chatty and colloquial style which those familiar with the Bulletins of the American Iris Society know so well.

I have detected one inaccuracy among the pedigrees. According to the Alphabetical Check List of the American Iris Society the parentage of 'Santa Barbara' should be (*I. mesopotamica*) × ('Kashmir White' ×) and not as on p. 70 (Seedling × 'Kashmir White'). Frequently in the pedigrees the term "seedling" is employed without any indication of what the iris so designated is a seedling of. Furthermore, on a number of occasions the term "sib" is used, sometimes alone, and sometimes, *e.g.* "Sib" to '*Courtesy*,' p. 79. Daydon Jackson defined "Sibling" as a term applied to a pair of plants from the ovaries or pollen of the same plant. The meaning attached to the term in this book is not at all clear and does not appear to conform to the definition in Daydon Jackson's Glossary. The supplement to this suggests that the term anyway is archaic.

A point of interest for iris enthusiasts in this country emerges, namely the extent to which the variety 'Gudrun' (Dykes, K.) has been used in American breeding; for this iris in spite of receiving the Dykes Medal and an Award of Merit has not been generally highly regarded here.

Finally it may be interesting to record that one American iris breeder alone is now raising from 10,000 to 30,000 seedlings, mainly of tall bearded irises, a year.

MORTON

An Introduction to the Principles of Plant Physiology. By Walter Stiles. 2nd edition. x + 701 pp. London, Methuen & Co. 1950.

To those who, in their student days, were familiar with Professor Stiles' classic work, a new edition is something of an event. Since the original edition was published in 1935 plant physiology has made great strides forward. The study of hormone mechanisms in particular has revolutionized our whole outlook and understanding of plant behaviour. Such growth phenomena as phototropism and geotropism and the innumerable growth-correlations typified by apical dominance and directional control of root and shoot branching, while still offering many unsolved problems, are now known to be explicable in terms of such mechanisms. The author has adequately revised the original text in terms of this modern concept.

A still larger field, that of developmental physiology, the study of the transition from the vegetative to the reproductive phase, has been opened up almost entirely in the last twenty years. The many apparently unconnected lines of approach, such as the study of carbohydrate-nitrogen relationships, photoperiodism and

vernalization are beginning to converge and Professor Stiles presents an up-to-date account of the, admittedly incomplete, picture.

For those needing a comprehensive reference book on all aspects of plant physiology, and especially for university students, this volume can be warmly recommended.

R. H. STOUGHTON

"The School Gardener" (Book One) By James Gillespie, B.Sc. 120 pp. Illus. (Blackie & Son.)

This book is intended to provide an introduction to gardening for pupils aged 12 to 15 years in all types of Secondary School. Since it is to be used by children, the author's aim has been to explain the science and principles of gardening in simple terms. In this he has succeeded, and for all but the dullest children the book should be very helpful. Most of the simpler gardening operations are described, the theory underlying them explained, and suggestions made for fundamental experiments.

Diagrams are clear except for Figs. 11A and 11B which are intended to illustrate the effect of lime on clay. Photographs might have been more useful here. A simple Index would have been helpful to the pupil.

P. R. S. HUNT

"Plant Anatomy." By Katherine Esau. xii + 735 pp., 85 plates, numerous line drawings. (John Wiley & Sons Inc., New York. Chapman and Hall, Ltd., London.) 72*s*.

The publication of Professor Katherine Esau's book entitled "Plant Anatomy" has been eagerly awaited by those who knew that she was engaged in writing it. The author, who is Professor of Botany at the University of California, is one of the leading American workers on plant anatomy, and those who are familiar with her published writings in scientific journals expected that her textbook would be a good one. In this they will find that they have not been disappointed, and Esau's "Plant Anatomy" will doubtless be one of the leading textbooks on this subject for many years to come. The plan of the book is on traditional lines, the cells of which the plant body is composed being first described, after which it is shown how they are arranged in the tissues of which the plant body, including the flower and the fruit, is composed. The subject is approached throughout from the developmental standpoint. The very numerous excellent line drawings throughout the text, and the eighty-five plates of photomicrographs at the end of the work add materially to the value of the book. There are separate indexes to authors and subjects and numerous carefully selected references for further reading. The book is essentially for the university student and research worker, rather than for the general horticultural reader, but all who are interested in the structure of the higher plants should endeavour to obtain a copy in spite of its necessarily rather high price.

C. R. METCALFE

"The Profitable Culture of Vegetables." By Thomas Smith. Edited and revised by Jeffrey Rhodes. 3rd Ed. xiv + 318 pp. Illus. (Longmans, Green & Co.) 25*s*.

This revised volume of Mr. Smith's useful book, first published in 1911, is welcome. Its usefulness, especially to the commercial grower, is borne out by the fact that so much of Mr. Smith's original text has stood the test of time. Mr. Rhodes has added valuable information in the light of research and the ever-increasing mechanisation of market gardening. The result is a book which is also of interest to the more ambitious private grower, while certain sections are instructive reading for the consumer as well, who has wondered about the grading, cleaning and uniform packing of the attractive produce which finds its way into the shops or about the meaning of certain terms, measures, weights and receptacles used in marketing produce. Numerous references are given at the ends of major chapters to guide the reader desirous of further research. Of interest are the miscellaneous tables of information including the average time for garden seeds to germinate, the average longevity of seeds, the approximate averages of yields per acre of various vegetable crops. All these features coupled with the well illustrated text make a comprehensive reference work on vegetable culture for the serious reader.

LANNING ROPER

"Two Acres Unlimited." By Carola Cochrane. 134 pp. Illus. (Crosby Lockwood).) 10*s.* 6*d.*

Two Acres Unlimited by Carola Cochrane provides 134 pages of concentrated Market Gardening, written in an attractive, happy style which clothes the simplest tasks with adventure. It is certainly a courageous story which treats disaster and success in the same spirit.

The author plainly admits her varied experiences, but discloses how these had their place in developing her business success.

While much of the text might well be found by wide reading in the large number of published books on the various crops and in our up-to-date Commercial Gardening Press, the presentation here is at once arresting, practical and readable.

There is much to be said for her literary method, which links the growing of each crop irrevocably with the final presentation so essential to successful marketing, just at the point the reader finds it most instructive.

This is a book which can be read as a fascinating detective story, with a continuous bias to explain the happenings on the land to the urban reader and buyer. It savours much of the persistence of the Scot, suggested perhaps by the author's name, although not a word anywhere proclaims any such relationship.

ROBERT L. SCARLETT

"Growing under Glass—Gardens and Gardening." Vol. VI. Edited by F. A. Mercer and Roy Hay. 141 pp. Illus. (The Studio Ltd.) 18*s.* 0*d.*

This attractive and interesting volume, the sixth of the series, is a fitting acquisition to the five previous ones, covering much of the ground that they had not touched upon. Much useful information will be found in the chapter "Reconditioning of the Garden" dealing with various types of soil, the value of manures, and how to get the best from them and touching on Pests and Diseases. The same may be said of "Greenhouse and Frame Construction" and the many uses they may be put to and their structural material. A good selection of various types are illustrated. A very important chapter is the "Heating of Greenhouses," which deals with the various methods, types of fuel, particularly details of heating by electricity, and its advantages, which should be of special interest to those who have hesitated to heat their greenhouses by this method. The chapters on Flowers, Fruit and Vegetables under glass are all dealt with in a very practical way, with helpful advice that should be easy to follow, with very useful lists of all sections dealt with, while the chapter on "Gardening Aids" with its practical hints, various accessories, and many useful mechanial appliances of various types so well illustrated, a great help in these days of the labour problem, should be of valuable assistance.

Little fault can be found of the nomenclature, one or two names being retained probably because they are familiar. The Arum Lily, *Zantedeschia* is under the name *Richardia*, a genus by priority belonging to *Rubiaceae*, *Gardenia florida* is now *Gardenia jasminoides*, and *Lachenalia nelsonii* is not a species but a variety of *L. aloides*, a plant perhaps better known by many as *L. tricolor*. *L. aloides* var. *nelsonii* is said to have been obtained by crossing the var. *aurea* back on the type. But these are only minor details.

The book is well printed, makes easy and interesting reading, while the many illustrations are excellent, being one of the principal features of the book. Those who have made a collection of all the volumes will find in them much useful information, and a work of reference for many years to come.

F. G. PRESTON

"New Green World." By Josephine Herbst. 272 pp. Illus. (Weidenfeld & Nicolson.) 15*s.*

In her pleasing little book on two eighteenth-century American pioneers, explorers and naturalists, John Bartram and his son William, Miss Herbst gives a vivid and readable account of the life and times of two notable and truly worthy men. The Bartrams were among the first botanical explorers of the Carolinas, Georgia and Florida, and corresponded with Collinson and Fothergill, to whom they sent seeds, plants and dried specimens. They were responsible for the introduction of many North American species to British gardens. William was also an artist of some merit and a number of his drawings and paintings of plants and animals, together with a manuscript journal of his travels in Georgia and Florida are preserved in the Botany Department of the British Museum. William has another claim to fame in that his descriptions of the American wilderness provided one of the many diverse elements

that emerged as "Kubla Khan" in a strange synthesis from Coleridge's subconscious mind. His influence may also be traced in Wordsworth, Southey and Chateaubriand.

New Green World will thus appeal to all interested in the early interplay of ideas between the Old and New Worlds.

Some criticism cannot be avoided. The Latin names are all too frequently misspelled. Miss Herbst's philosophical commentary is at times a little too obtrusive and her metaphor probably unintentionally amusing, as when for example, she gives a picture of eighteenth-century man sitting down in contact with solid ground and gaining his strength through a new law of gravitation! More seriously, her failure to consult the original documents in the British Museum is perhaps a matter for regret rather than reproach; but her apparent complete ignorance of the scholarly and beautifully illustrated works by Francis Harper (in *Trans. Am. Phil. Soc.* 1942–3) annotating John Bartram's Diary (1765–6) and the journal of William Bartram's Travels (1773–4) is less forgivable.

A. W. EXELL

"Vegetable Gardening." By Arthur J. Simons. "Lawns." By R. B. Dawson. "House Plants." By A. J. Huxley. 92 pp. each. Illus. *Amateur Gardening* Handbooks Nos. 9, 10, 11. (W. H. & L. Collingridge Ltd.) 3*s*. 6*d*.

The publication of these three volumes make a welcome addition to the series. Mr. Simons devotes considerable space to the basic principles of vegetable growing, to the seed and the plant order and to the preparation of the ground. The last half is devoted to the actual cultivation of each variety of vegetable. Mr. Huxley has written a concise well-planned book on House Plants giving guidance on their cultivation, propagation and day-to-day maintenance, with words of warning about the eccentricities of some. Mr. Dawson was an excellent choice for a book on lawns as he has been Director of the St. Ives Research Station, Bingley, Yorkshire, since 1929. He covers briefly but clearly the major operations involved not only in making a good lawn from turf or seed, but in maintaining the established lawn. All these volumes are illustrated with simple explanatory line drawings by Miss C. Newsome-Taylor.

LANNING ROPER

"The Flowering Cactus." By R. C. and Claire Meyer Proctor. Edited by Raymond Carlson. 96 pp. Illus. in colour and black and white. (Published by McGraw-Hill Book Co., Inc., 1954.) Price 53*s*. 6*d*.

The photographic work of the Proctors is not unknown in this country but so far has chiefly been seen in *Arizona Highways* and similar publications; now eighty of their fine colour photographs of cacti have been gathered together in one volume with an accompanying text, briefly descriptive, rather in the manner of a guide book. The illustrations are, of course, excellent; there is, however, a tendency to concentrate on the flower, which is often viewed from above, so that the character of the plant itself is somewhat obscured and the accuracy of its colouring subordinated to the brilliance of the blossom. No scale is given and, though some of the flowers are shown less than life size, many of them are much larger than life, whereby a false impression is given. The pale flowers of the night-flowering cerei, for which black backgrounds have been used, are very lovely, but the rather harsh blue used behind some of the more brilliant blossoms is less pleasant. Only four landscapes have been included and these seem to me to give a truer picture of the desert in flower. The method of production has heightened the flamboyant effect, for the plates are bled off, without surrounds, and the result is rather overpowering; a little more subtlety in the colouring would be more pleasing to English eyes.

The Latin names of each plant are given in the legends accompanying the illustrations, generally with a common name as well, for the editors "have used all old established common names that are available. Since there are not enough to go round, names have been coined to offset the shortage." It may be easier to remember 'Fendler's Hedgehog' rather than *Echinocereus Fendleri*, though I doubt it. Regarded as a picture book this is a most colourful production which many people will appreciate.

VERA HIGGINS

The following books have been received:

"Bee Hives." Bulletin No. 144 of the Ministry of Agriculture and Fisheries. 20 pp. Illus. (H.M.S.O.) 1*s*. 6*d*.

"Amateur Gardening Annual." Edited by A. G. L. Hellyer. 132 pp. Illus. (W. H. & L. Collingridge Ltd.) 5*s*.

"Les Cactées et les Plantes Grasses." By P. Fournier. 2nd ed. 418 pp. Illus. 63 coloured plates. (Encyclopedie Practique du Naturaliste.) 2,000 fr.

"Bird Recognition," volume 3. By James Fisher 158 pp. Illus. (Penguin Books.) 3*s*. 6*d*.

"Drying Flowers for Color." By Sarah Whitlock and Martha Rankin. 16 pp. Illus. (Mrs. Sarah Whitlock, Gildersleeve Wood, Charlottesville, Virginia, U.S.A.) $1.

"Journal of Experimental Botany," volume 6, number 16. 151 pp. Illus. (Oxford. At The Clarendon Press. London. Geoffrey Cumberlege.) £1 2*s*.

"The Rose Annual 1955." Edited by Bertram Park. 195 pp. Illus. (National Rose Society of Great Britain.)

"The Gladiolus Annual 1955." Edited by A. E. Blake. 132 pp. Illus. (A. E. Blake.) 10*s*. 6*d*.

"The British Delphinium Society's Year Book 1955. Edited by Ronald Parrett and Montague Lacey. 140 pp. Illus. (The British Delphinium Society.) 7*s*. 6*d*.

"The Soils of the Glastonbury District of Somerset." Ministry of Agriculture and Fisheries. Memoirs of the Soil Survey of Great Britain and Wales. 131 pp. Illus. (H.M.S.O.) 15*s*.

"Bishop's Concise Gardening Encyclopedia." By W. B. Bishop. 190 pp. Illus. (Elliott Right Way Books.) 6*s*.

"The New Outdoor Tomatoes." By Roy Genders. 112 pp. Illus. (Museum Press Ltd. London.) 7*s*. 6*d*.

"Journal of Experimental Botany," volume 5, number 15. 433 pp. Illus. (Oxford University Press.) 16*s*.

"The Observer's Book of British Birds' Eggs." By G. Evans. 217 pp. Illus. (Frederick Warne and Co. Ltd.) 5*s*.

"The Cultivation of the Mesembryanthemaceae." By Professor Dr. G. Schwantes. 88 pp. Illus. (Blandford Press Ltd.) 15*s*.

"Report on Insect Pests of Crops in England and Wales 1938–1943." 91 pp. (H.M.S.O.) 3*s*. 6*d*.

"Commercial Mushroom Growing." By M. H. Pinkerton. 223 pp. Illus. (Ernest Benn Ltd.) 21*s*.

"Camellia Annual of the Australian and New Zealand Research Society," June 1954. No. 1. Price £1 1*s*. 0*d*. per annum.

"Experiments in Tree Planting on Peat." Forestry Commission Bulletin No. 22. 110 pp. (H.M.S.O.) 10*s*.

"1955 Amateur Gardening Diary and Horticultural Directory." (W. H. & L. Collingridge Ltd.) 6*s*. 2*d*.

"Handbooks for the Identification of British Insects. Coleoptera." Vol. IV. Part 8 (a). By C. E. Tottenham. 79 pp. (Royal Entomological Society of London, 41, Queen's Gate, S.W. 7.) 15*s*.

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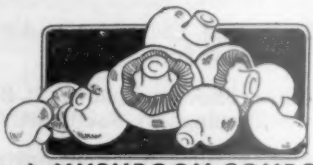

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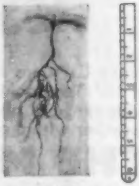

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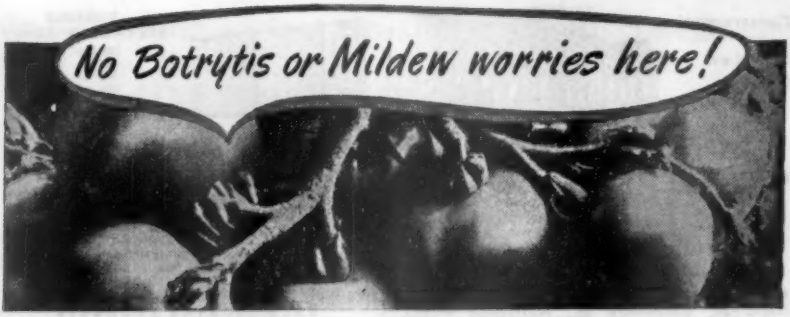

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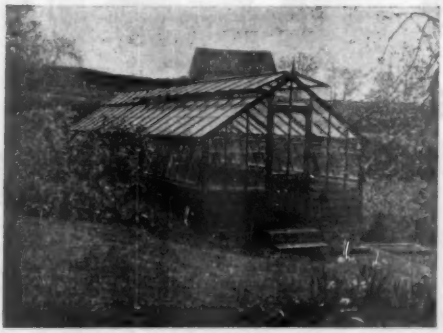

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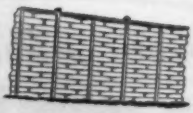

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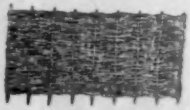

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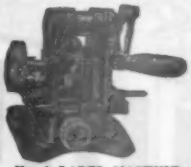
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